

**ARCHITECTURE DEPARTMENT**

**CHINESE UNIVERSITY OF HONG KONG**

MASTER OF ARCHITECTURE PROGRAMME

2001-2002

DESIGN REPORT

## **LIVING ON WATER**

TSE Yiu Hung

April 2002



THESIS DESIGN REPORT 2001-2002

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## LIVING ON WATER

Tse Yiu Hung



Department of Architecture  
The Chinese University of Hong Kong  
( Graduation of 2002 )

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# LIVING ON WATER

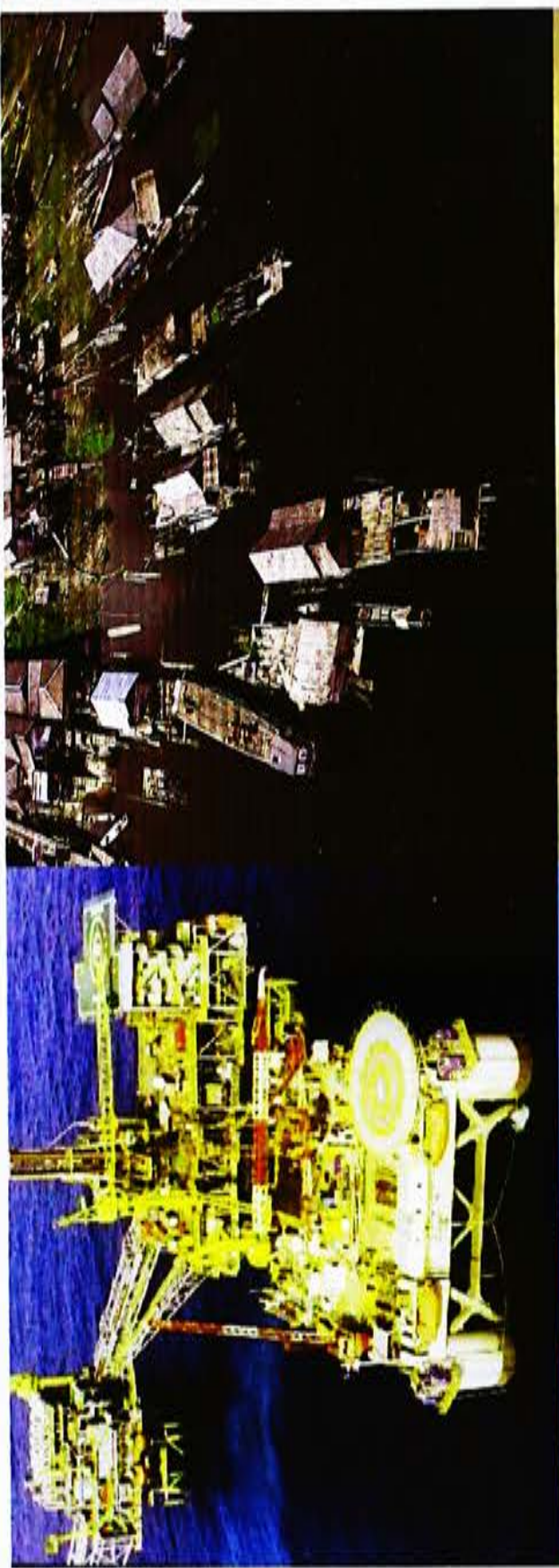
## Intention

The water surface takes up 70% of the earth surface and it is seemed to be increasing if global warming is continuing. But, it is also a **vast virgin “land”** for exploration either for resources and habitation.

Human beings have tried much effort to adopt the ways of living in the water surface either for purpose of resources exploration, earning a living or resulted from cultural development. The off-shore platform compacts the living and working quarters in a single man-made island. The poor population in SE Asia and South China has adopted their ways of living with water due to their needs and culture development. It is a harsh living area for those people.

However, on contrast, the water is a **dream of romance and mysteries** for people living on land. It provides tremendous view and **imagination without any restriction** for the land people. The freedom implied by water surface impresses our mind very much.

So, How can people live on the water as a **community** is what I am going to explore in my thesis.





# R e s e a r c h e s







# LIVING ON WATER

## Characteristic of floating communities

### Early age marriage

Most of the boat people will get married in his early 20 but it is very common for female to have a marriage about 14-16. They usually marry with the boat people not carrying the same surname. The land people are not willing to marry with the boat people who have a quite harsh life. For the time of 70-80'S, it was very common for the male to find his wife in mainland China. The situation caused a serious social problem when the government tried to provide housing and asked the boat people to dwell on land after a serious fire happened in Aberdeen typhoon shelter.

### Simple family structure

Most of the boat people know little about their ancestors. They keep no family records because they are nearly all illiterate.

Most of the living boat contains one family only due to the limited space of the boat. When their children grow up, another boat will be purchased if they have got married.

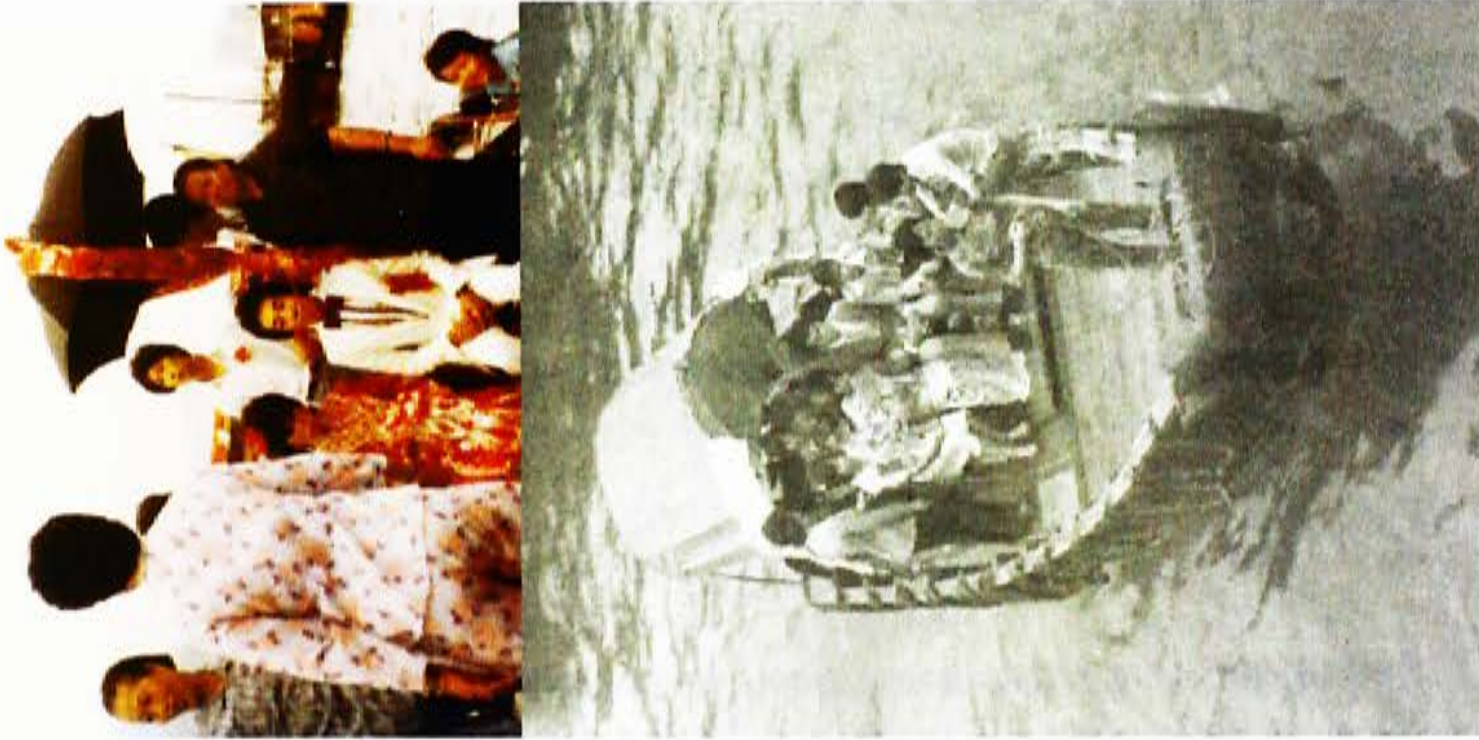
### Knowledge

Most of the boat people in the past are illiterate. Their children had not received proper education. The parents would teach their children by their own experience.

### Death

The boat people are reluctant to leave their boats. They preferred to die and had their funeral carried out on the boats. But for respect of the death, burial was commonly adopted.

They believed that the soul of the death would stay with the tablet with the dead man's name written on it. His children then would carry the tablet as they went out to sea to ensure the spirits of the dead are always with them and look after them to make sure that they do not get in trouble.





## Characteristic of floating communities

### Religious and superstition

When giving birth to children, a woman is regarded as impure or unclean. She cannot touch any boat that is not her own. After a child is born, he must be formally introduced to patron saints, Tin Hau (Queen of Heaven) or Hung Hsing (Fishermen God of Weather).

The boat people try not to break off any of the broiled fish bones nor to turn the fish over to eat the other side because it portends shipwreck and may lead to untold disasters.

When the boat people want to dry their clothes, they do not hang their laundry high up on the mast. This will obstruct the swift passage of unseen spirits in the air.

They will also offer theatrical performances, singing, puppet shows, shadow plays and dancing to please and placate the gods.

When a boat is nearly complete the owner of the new boat invites relatives or friends to a sail making. It is a mutual aid society organized by relatives and close friends.





# LIVING ON WATER

## Characteristic of floating communities

### Festivals

-Tin Hau (23rd day of the Third Moon)

-Hung Hsing ( 13th day of the Fifth Moon)

-Tam Kung (8th day of the Forth Moon / a fortnight previous to the Tin Hau Festival)

Tam Kung is purely a local saint, whose influence over the weather also endears him to the floating population. Decorated junks bringing screens of flowers, with characters reading ?A Happy Birthday to Tam Kung? moor outside the temple.

-Koon Yum (19th day of the Second Moon, 6th and 9th day of the 11th Moon)

She is less popular than Tin Hau among the boat people. She is worshipped mainly by boat women.





# LIVING ON WATER

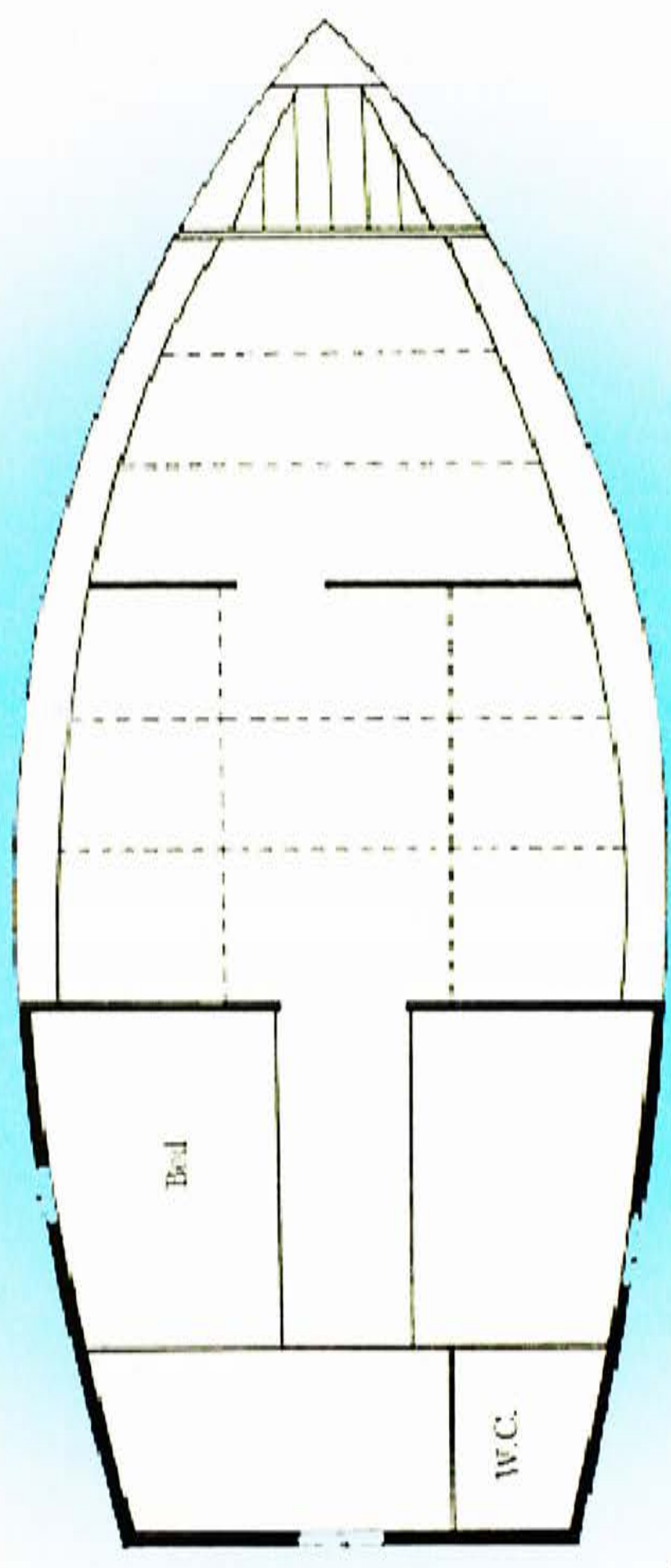
## Characteristic of floating communities

General spatial arrangement of the living boat

The front part of the ship is very important for the fisherman. They altar their gods at the front where the gods lead their journey in the dangerous sea. All the visitors visit the family from the front part where it is also a place for dinning and meeting other people. Besides, the connection to other ships also begins at the front. These connections are the social space for floating communities especially when they are packed together in the typhoon shelters.

### ACCOMMODATION

### LIVING & KITCHEN



The rear part is for accommodation and storage where contains toilet as well. The living space is very limited compared to the flats on land.



# LIVING ON WATER

## Recent Situation of the Floating Community

### Reasons for Retaining at Sea

People in the typhoon shelter stick to the memories of their past flourish. They like to talk about the golden old days as the typhoon shelter attracted so many visitors from the land to come for special foods like roasted duck congee, fired clams and boat congee. People could enjoy singing and listening to Chinese opera in the boats also. Besides, the boat for the boat people is his house where he works and plays. This is also the place for them to bring up as a child himself. Thus, it is a memorable place for the aging people.

However, most of the young people went to land because of the rising education levels and plenty of job opportunities. What make the boat people still stick to the sea excepting the above are because of the following reasons:

- 1.They are too old to adapt the way of living on land.
- 2.They can earn a living on boat whereas they feel uncertain on land.
- 3.They are hard to find a job on land.
- 4.It is appropriate for them to live on boat because their working hours are different from those on land.





# LIVING ON WATER

## Recent Situation of the Floating Community

Classification on Living Boats

Boat houses (**Sampan Type** / Floating platform / Hybrid Type / Fishing Boats)

Most of the boathouses in Typhoon Shelters are transferred from the previous sampan. It is mainly sheltered by movable canvas to keep the privacy and protect the occupants from rain and typhoon. Each boat mainly accommodates one couple or a single person who has difficulties in living on land.

It also keeps the general spatial arrangement of traditional house boat. Electricity supply is scarce. They light up their living quarter mainly by candles or gasoline lamps.

Each boathouse has its own sampan which is mainly for transportation and to supply certain goods to the fishing boats and yachts.





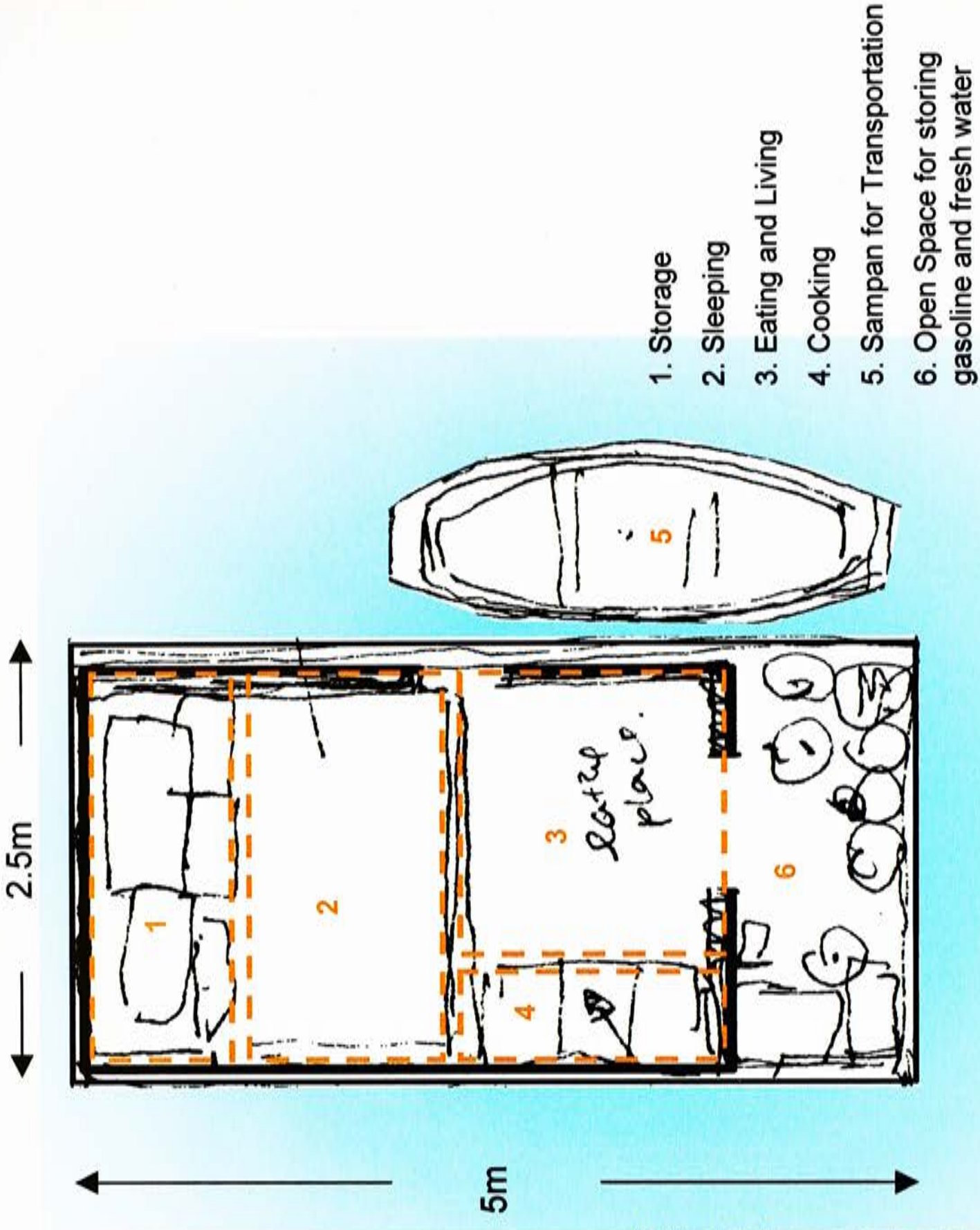
LIVING ON WATER

Recent Situation of the Floating Community

Classification on Living Boats

Boat houses (Sampan Type / Floating platform / Hybrid Type / Fishing Boats)

Spatial Arrangement





LIVING ON WATER

Recent Situation of the Floating Community

Classification on Living Boats

Boat houses (Sampan Type / Floating platform / Hybrid Type / Fishing Boats)

Spatial Arrangement



Altaring activities is still at the front of the living quarter.  
Canvas are used for shelter which are tied together by strings.

The height of the living area is not favor for standing. Only sitting and bending activities are allowed.

The occupants use sliced bamboo or steel tube for construction of the frame.





# LIVING ON WATER

## Recent Situation of the Floating Community

Classification on Living Boats

Boat houses (Sampan Type / Floating platform / Hybrid Type / Fishing Boats)

The houses built on floating platform are not movable. They are moored on fix location where rent (about \$2000-3000 per year) should be paid to the government. The occupants are previous fishermen. Nowadays, the adults usually work on land and live in boat because the rent on boat is much cheaper than rent a flat on land. They need to buy living stuff on land and take water from the water supply station. Usually, they will have their own transportation boat or small fishing boat.

They usually generate electricity by the diesel generator. Television sets are not uncommon for the occupants.

The house will usually be divided into two storeys -the upper part is used for drying things like fish and act as a leisure spaces for the occupants. The lower part is for accommodation.





# LIVING ON WATER

## Recent Situation of the Floating Community

Classification on Living Boats

Boat houses (Sampan Type / Floating platform / Hybrid Type / Fishing Boats)

### Spatial Arrangement

The front part of the floating house is usually the kitchen area and living area where ventilation and lighting is the best comparing with the rear part of the boat house.

The rear part usually constructed as bedroom areas with very small sliding windows. The bedrooms are really dark and not very well ventilated. The toilet and the shower area are attached at the very rear of the boat with pipes to discharge the sewage into the sea directly.

The kitchen always located at the semi-open space to enhance the discharge of the smoke and thus reduce the fire risk to the accommodation area.

The occupants general store as many things as they can.

The occupants usually have dogs as pets. And the house is constructed by wood.





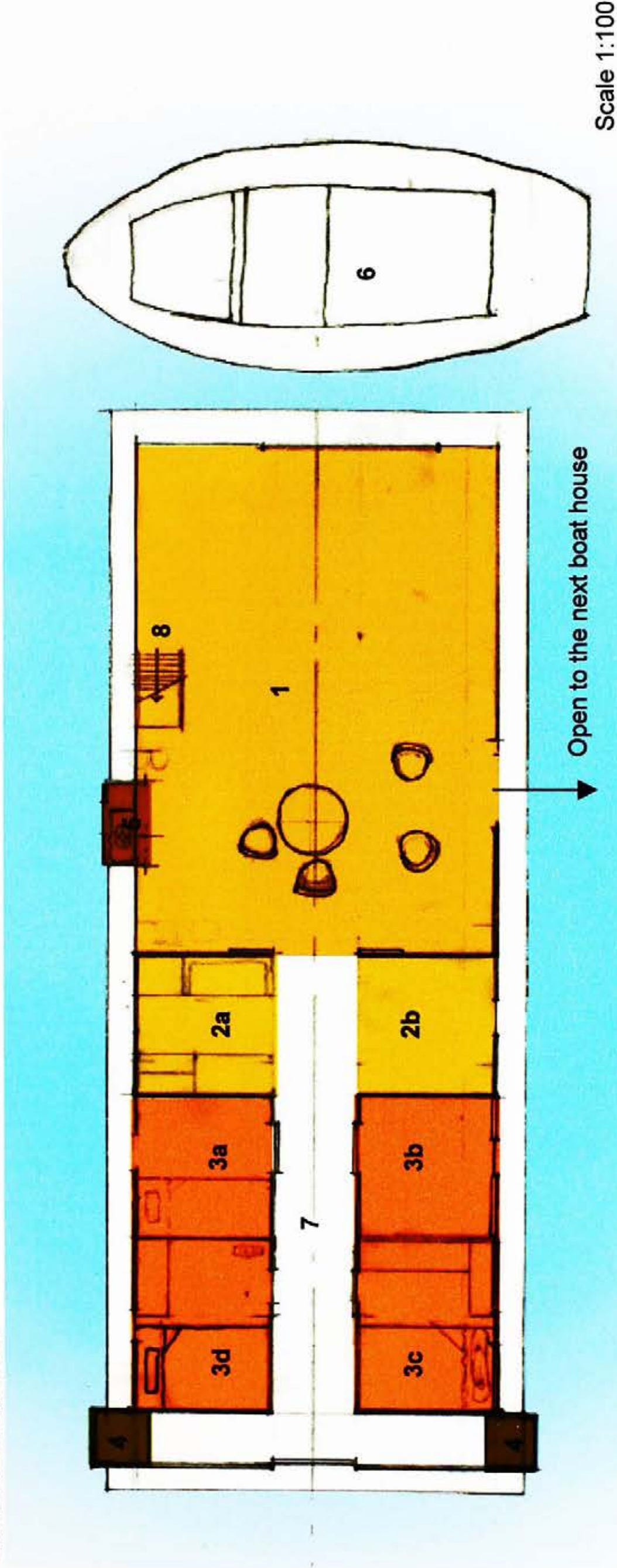
LIVING ON WATER

Recent Situation of the Floating Community

Classification on Living Boats

Boat houses (Sampan Type / Floating platform / Hybrid Type / Fishing Boats)

Spatial Arrangement



- 1. Living and Eating area
- 2a. Enclosed living area for watching TV
- 2b. Enclosed living area for drying clothes and for storage
- 3a. Bedroom for the grandmother
- 3b. Previous bed room but now is for storage
- 3c. Bed room for two children
- 3d. Bed room for master
- 4. Shower room and toilet
- 5. Kitchen
- 6. Private owned transportation boat
- 7. Corridor
- 8. Steep stair to upper level



LIVING ON WATER

Recent Situation of the Floating Community

Classification on Living Boats

Boat houses (Sampan Type / Floating platform / Hybrid Type / Fishing Boats)

Spatial Arrangement

The space between the boat and the house is also a place for children to play



Living and Eating area -its brightness contrasts to the dark sleeping area



Dark master room with air-conditions



Kitchen area with windows to allow smoke out



Dark corridor leading to bright end





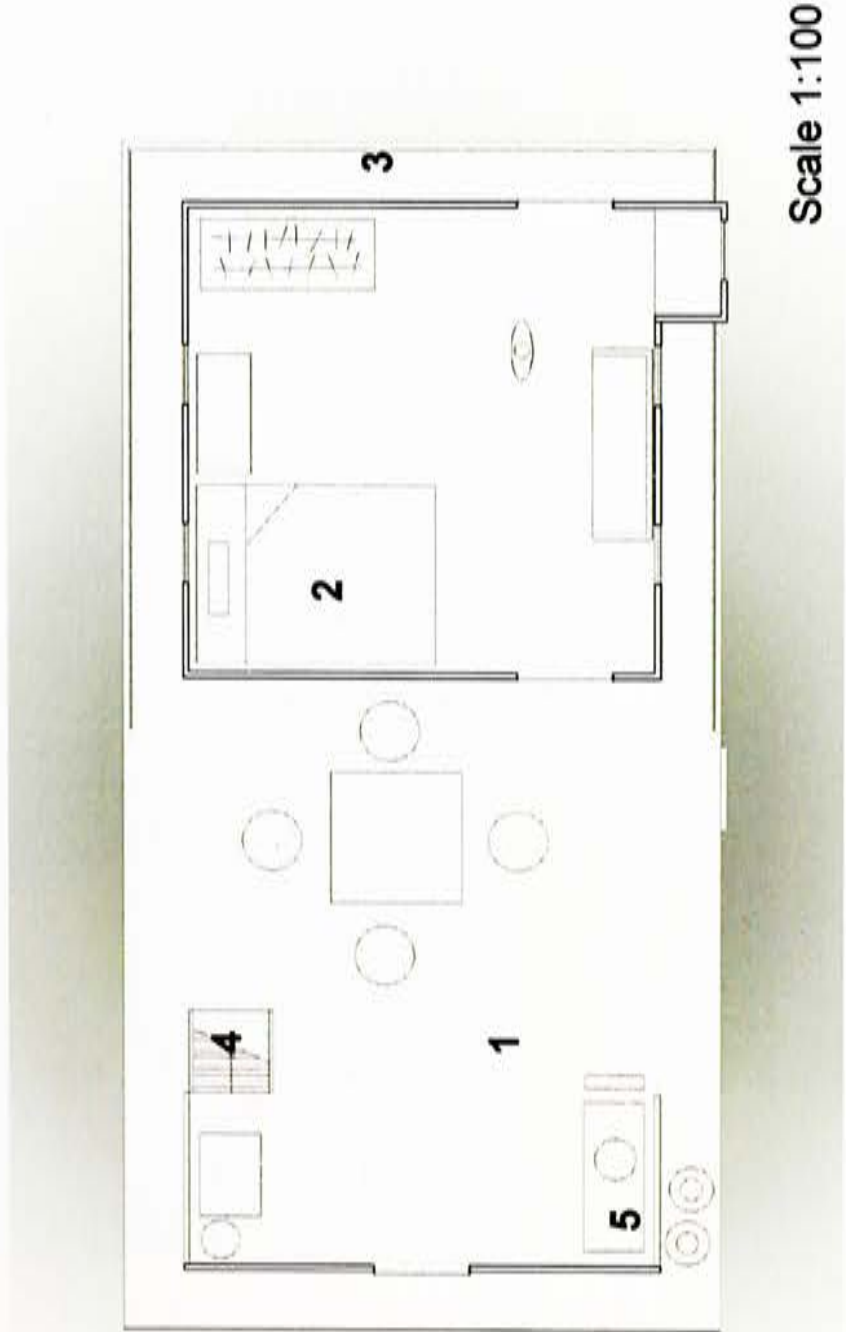
LIVING ON WATER

Recent Situation of the Floating Community

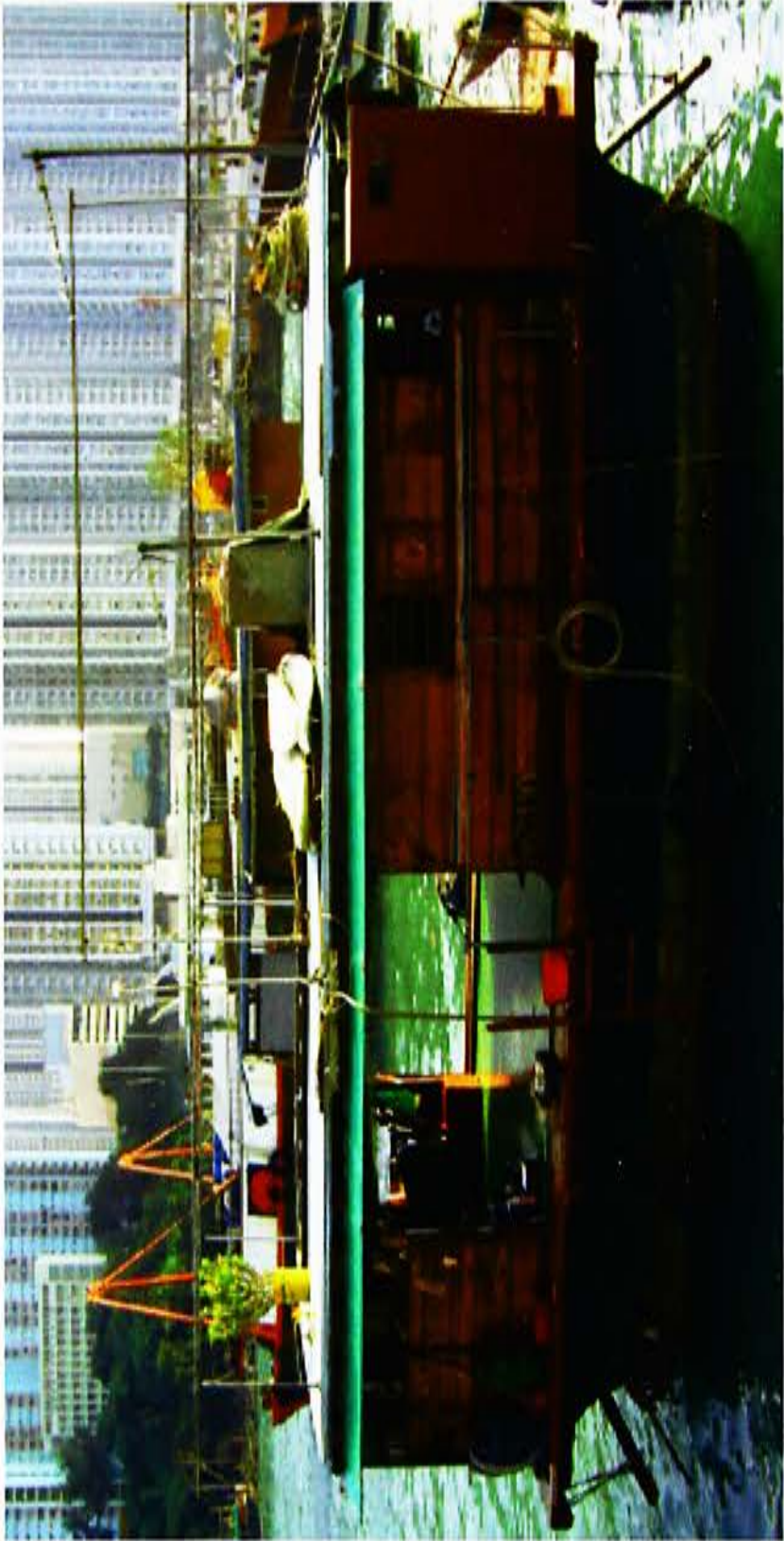
Classification on Living Boats

Boat houses (Sampan Type / Floating platform / Hybrid Type / Fishing Boats)

Spatial Arrangement



- 1. Living and Eating area
- 2. Sleeping Area with T.V.
- 3. The recess area is used for drying clothes
- 4. Stair to upper floor
- 5. Kitchen





LIVING ON WATER

Recent Situation of the Floating Community

Classification on Living Boats

Spatial Arrangement

Boat houses (Sampan Type / Floating platform / Hybrid Type / Fishing Boats)



At the front of the boat house, the front part is kept important as traditional arrangement. A wall is constructed to block the evil spirit and to keep privacy.



Sliding door and windows are used instead of hinged one to minimize the risk during strong wind.





# LIVING ON WATER

## Recent Situation of the Floating Community

Classification on Living Boats

Boat houses (Sampan Type / Floating platform / **Hybrid Type** / Fishing Boats)

Aberdeen is famous by its floating seafood restaurants. They are connected and park next to land to get electricity and water supply. A hinged bridge is designed to deal with the difference in tidal levels to link the seashore and the floating restaurants. Only the owners and workers asked for accommodation will live in rear part or upper floor of the boat.

Some boats will be transferred into boat stores which provide the daily necessities for the fishermen and yachts. The owners will live at the rear of the store. The semi-open space in front will act as a community space for chatting and playing mahjong.





# LIVING ON WATER

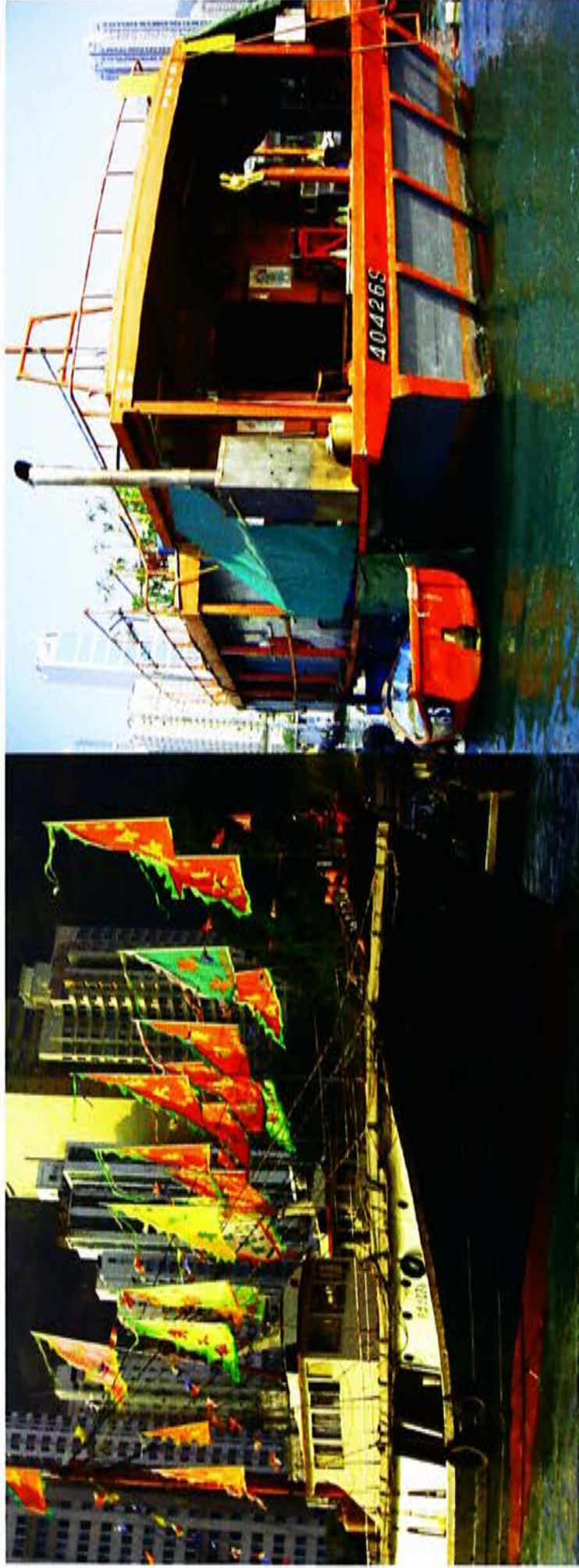
## Recent Situation of the Floating Community

Classification on Living Boats

Boat houses (Sampan Type / Floating platform / Hybrid Type / Fishing Boats)

Some fishing boats will be assigned as temple boats for worshipping by the fishermen. They will be decorated by colorful flags and carry the blessing characters. The fishing boats using for altar will be assigned by rotation..

Some of the previous floating shipyards had transferred into floating stores to supply foods and goods to the fishing boats and yachts. Their living environment is much better than those sampan type boathouses. The sea temple which is called Shan Kwok Tin Hau Temple (三角天后廟) is the only floating temple in Hong Kong. It will moves to Aberdeen for altar and repair for 3 days. It houses the God of the fishermen to altar for protection from the sea risks.





# LIVING ON WATER

## Recent Situation of the Floating Community

Classification on Living Boats

Boat houses (Sampan Type / Floating platform / Hybrid Type / Fishing Boats)

Working boats are those boats used for catching fishes and shrimps. The fishermen usually live on boat because of the convenience. They need to go to the sea by very early morning so that living on the boat is more convenience for them. Besides, some fishermen need to go to the South China Sea to catch fishes also need to live on boat for the most of time.

*Shrimp boat in Causeway Bay*



*Fishing boat in Aberdeen*



Recent Situation of the Floating Community

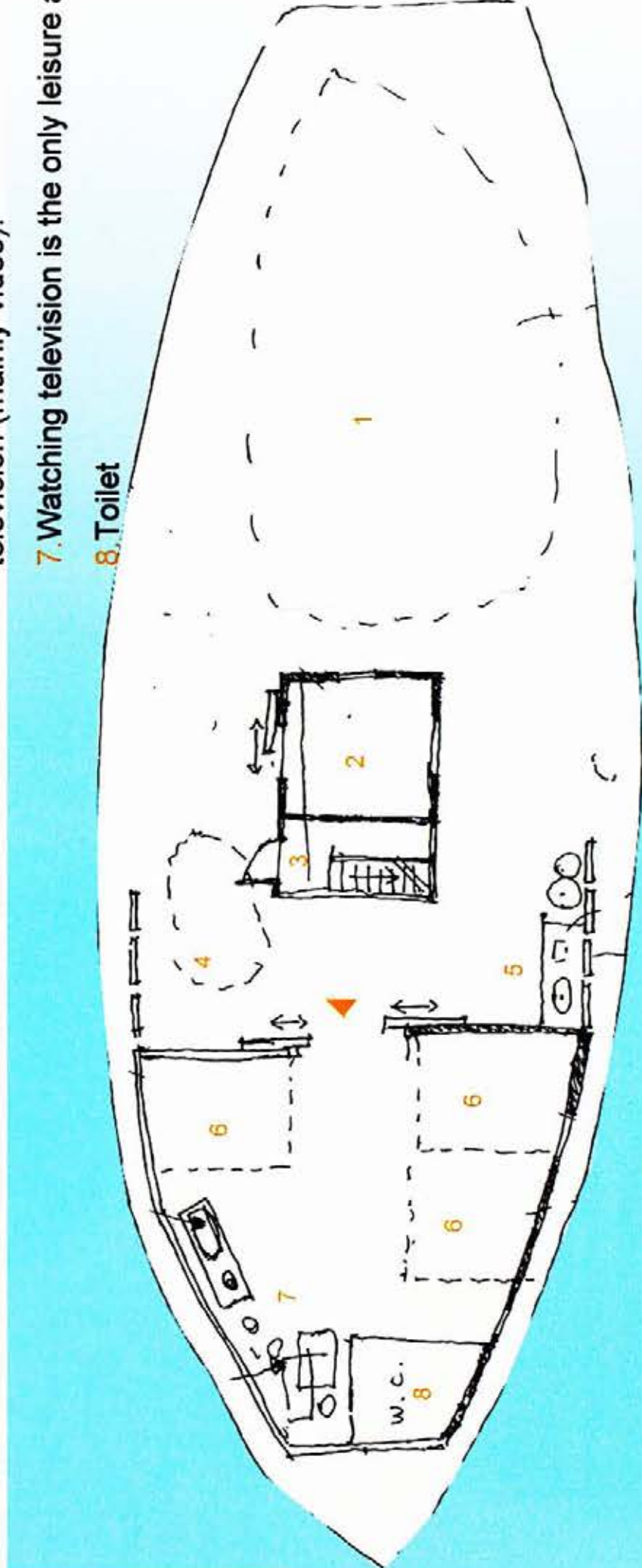
Classification on Living Boats

Boat houses (Sampan Type / Floating platform / Hybrid Type / Fishing Boats)

Spatial Arrangement

- 1. Preparation space for cleaning the nets and fishing tools and it also acts as a chatting space for the fishermen.
- 2. It is the captain's cabinet with relatively small in size and it is a suitable location because it is near to the bundle.
- 3. Stair to the control room
- 4. The eating place is located in the semi-open area with movable panels to provide shelters in case of bad weather.
- 5. Cooking area is also located in semi-open area where smoke can be easily ventilated away.
- 6. Sleeping area for the workers or their sons. It is also a living room for watching television (mainly video).
- 7. Watching television is the only leisure activities on boat.

8. Toilet





### The Typhoon Shelters

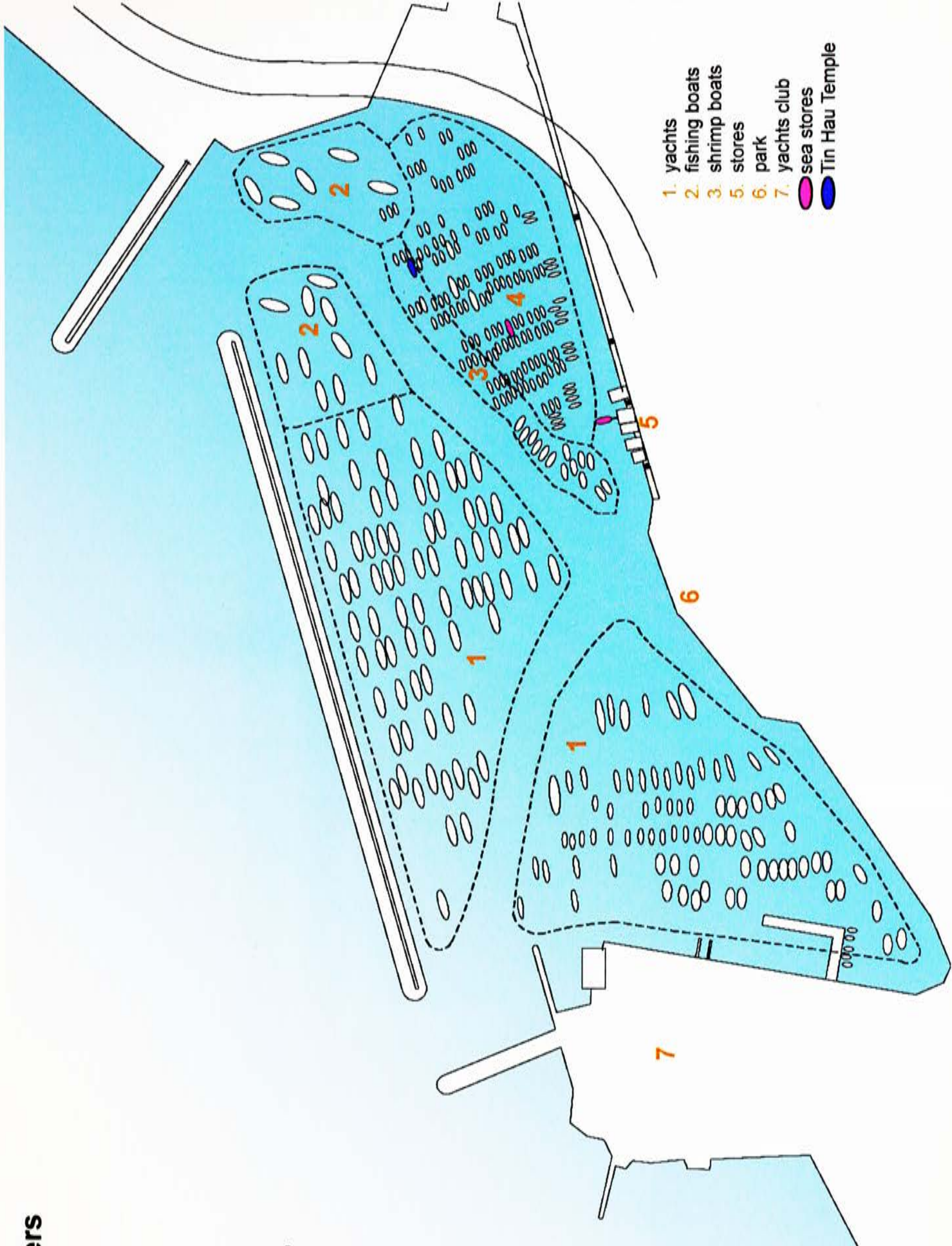
#### Zoning

The Causeway Bay typhoon shelter is occupied by 4 kinds of boats. The yachts and sailing boats occupied the sailing space with most beautiful view and next to the yachts' club.

The fishing boats which are needed to go to far sea to catch fishes is located next to the entrance of the typhoon shelter because they are more stable to deal with the wave forces. The shrimp boats is located just next to the main waterway which is the most convenient for them to moor their boats.

The boat houses are located next to the bank where wave forces is the weakest.

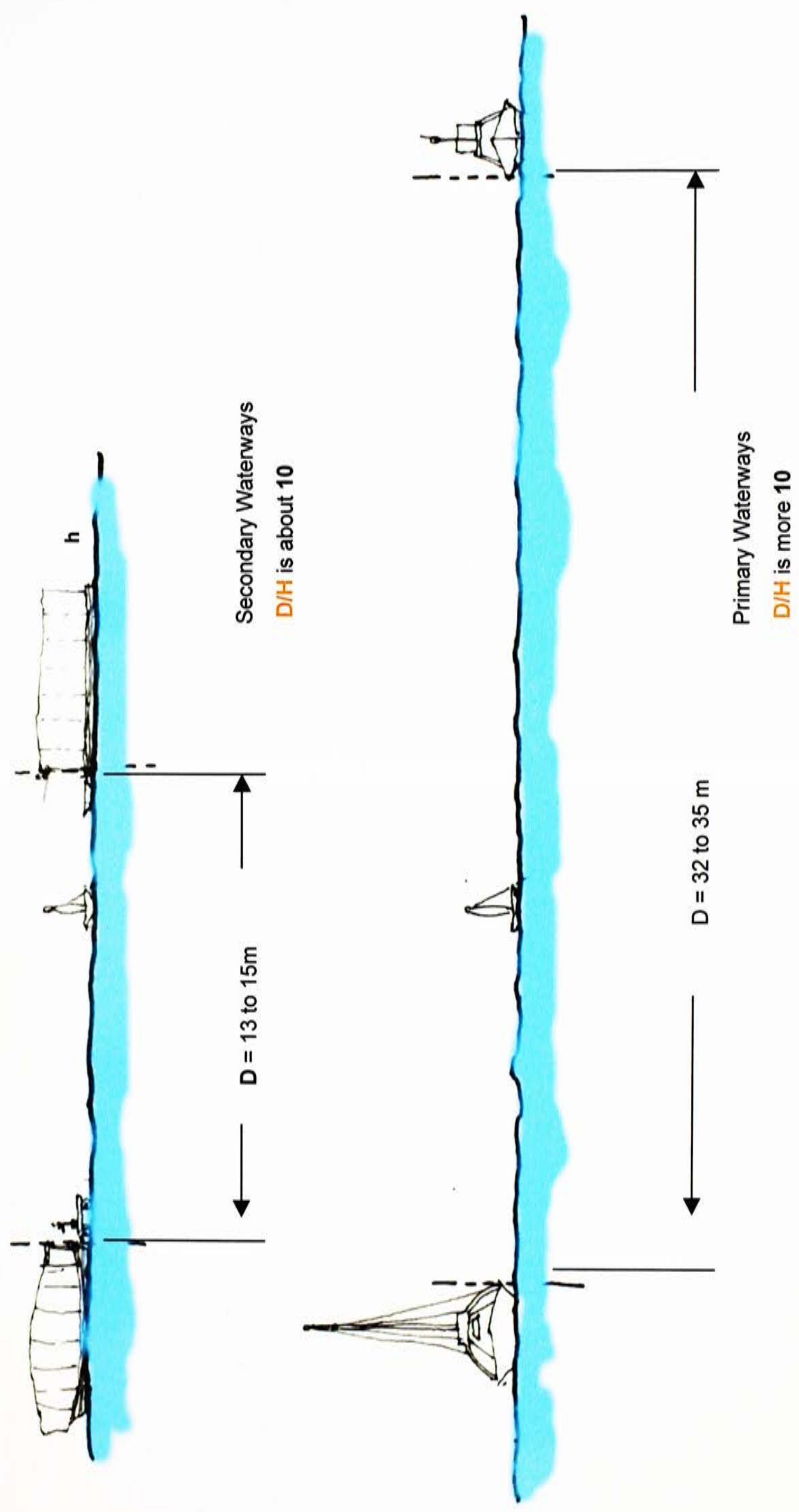
The silted structure on land and the park next to the typhoon shelter are the communal spaces for the boat people where they can access easily.





The Typhoon Shelters

Waterways & D/H Proportion

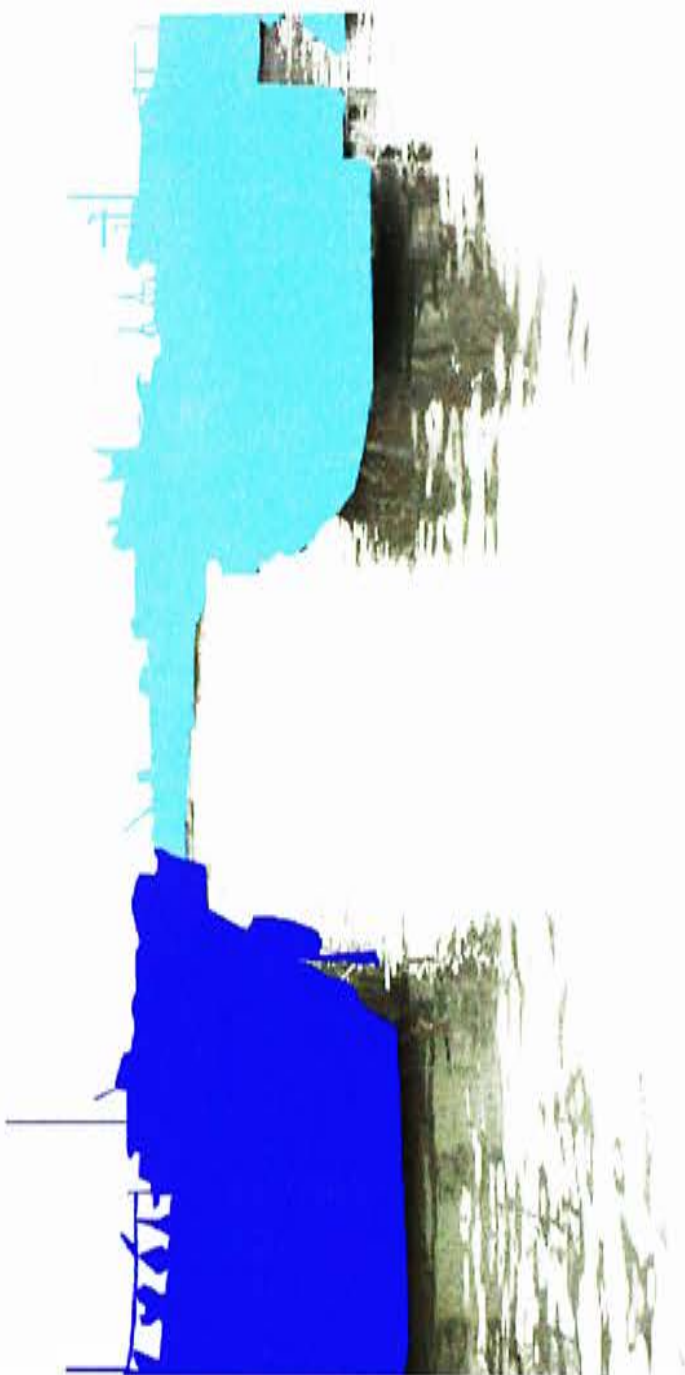




The Typhoon Shelters

Waterways

Visual Impact

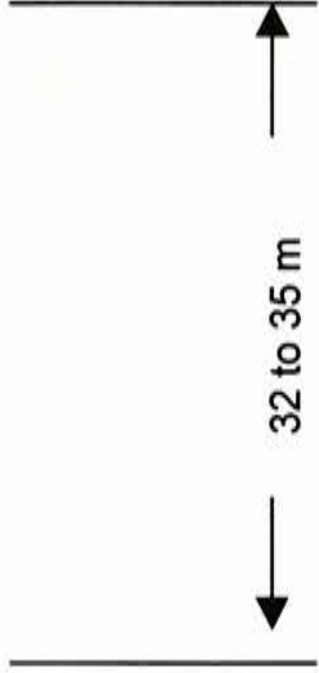




The Typhoon Shelters

Waterways

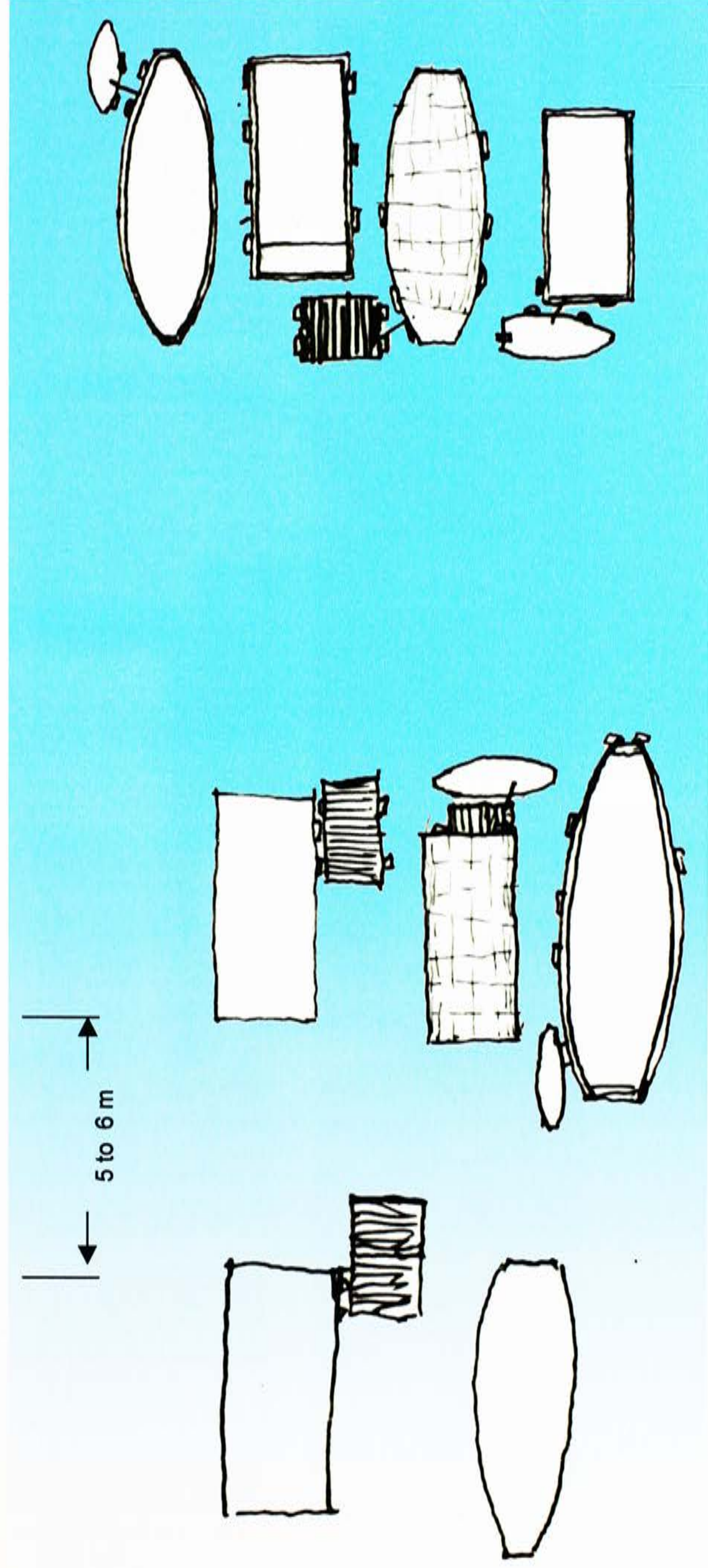
Visual Impact





The Typhoon Shelters

Activities Analysis



The chatting activities always occurred on the floating platform and the sampan where they can escape from the dark and poor ventilated interiors. They are used to washing clothes, preparing meals, planting and chatting on the platforms when the weather is not bad. The platforms are acted as reception areas for the occupants.



**The Typhoon Shelters**

Activities Analysis





## **Preliminary Design and Ideas**



# LIVING ON WATER

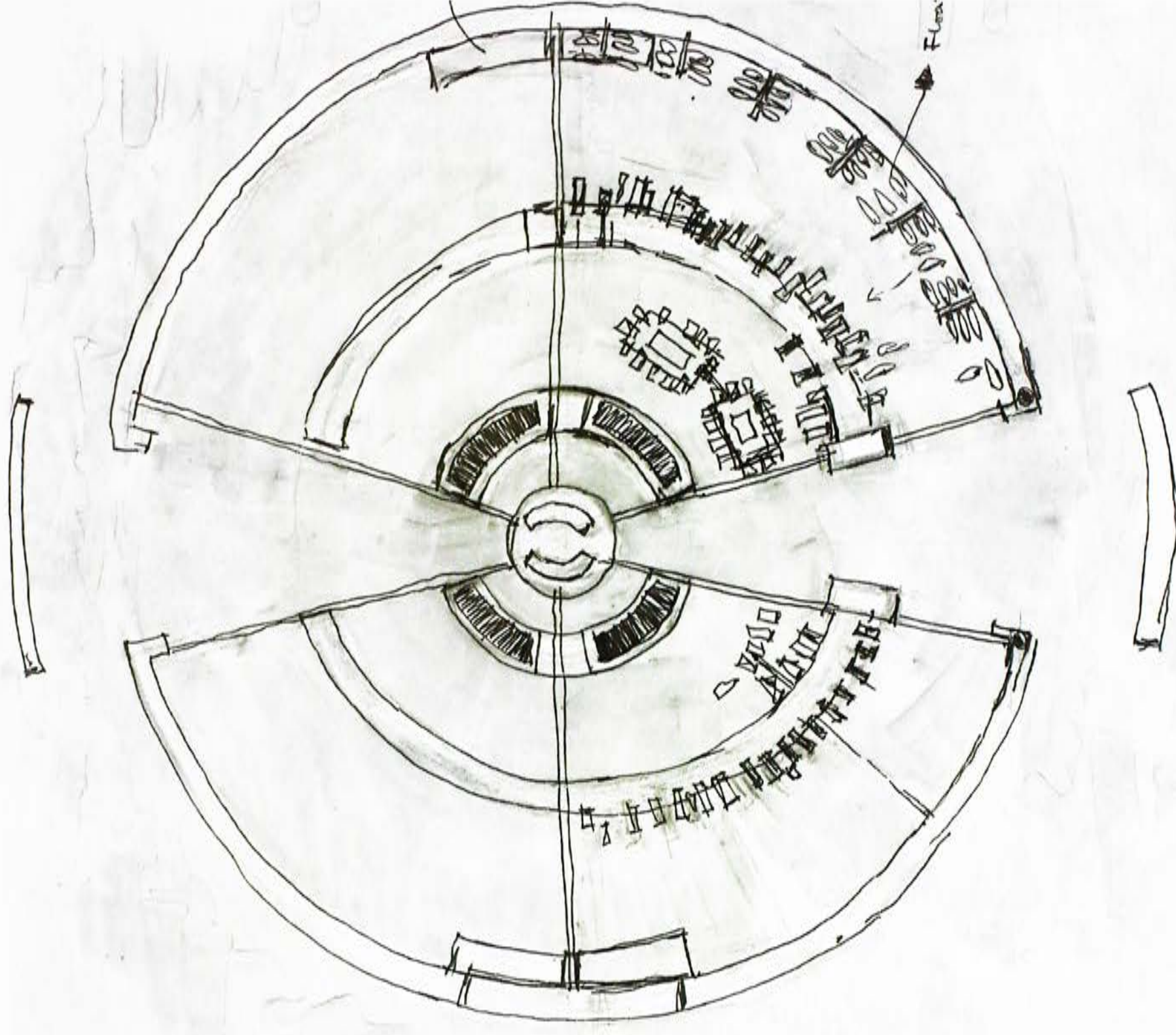
## Preliminary Design

### community

- “an interacting population of various kinds of individuals (as species) in a common location” or
- “a group of people with a common characteristic or interest living together within a larger society”
- fulfilled with the **commercial, social** and **psychological needs** of their citizens

The boat implies **symmetry**. It is the most adaptable way on sea for **structural** reasons.

The **uniqueness of water surface** favors geometrical arrangement.





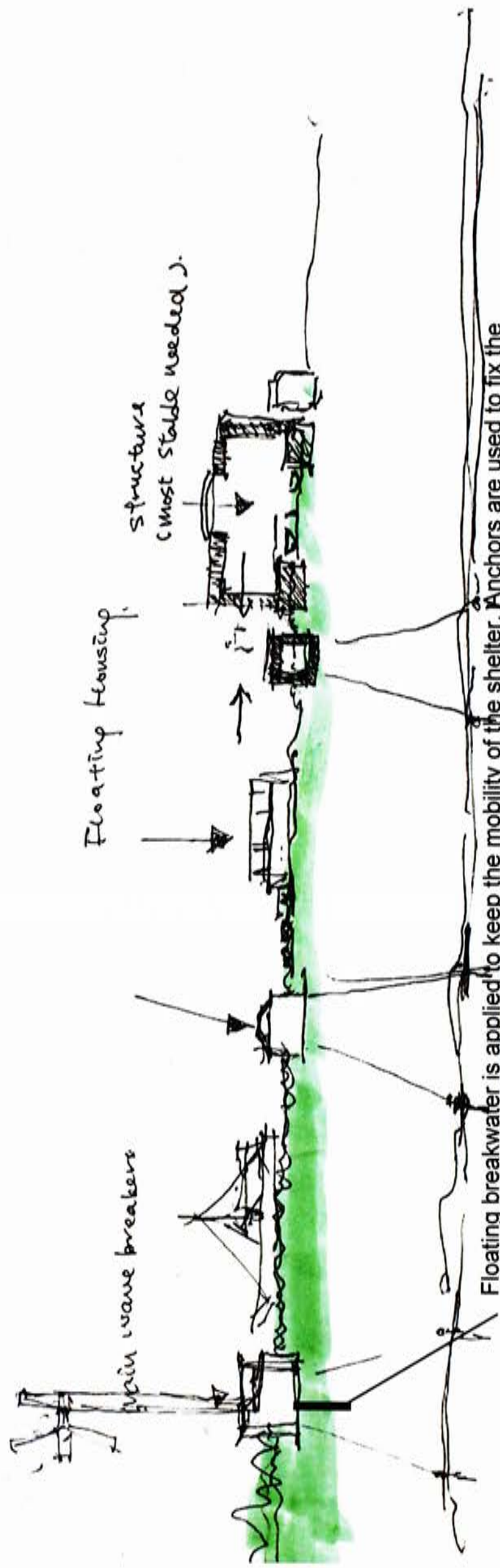
# LIVING ON WATER

## Preliminary Design

The idea of floating and movable implies certain degree of **self-contained**.

As way as waves

- water colonies



Floating breakwater is applied to keep the mobility of the shelter. Anchors are used to fix the breakwater in location. The heavy fishing boats and yachts are put to the outer part because they can tolerate more for the wave force.



# LIVING ON WATER

## Preliminary Design

### Memorable Qualities

We attempt to perceive the city or townscape, not in terms of concrete features, but as images of the structure of those perceived forms. It is the **images** of a city or townscape **shared by many people**, not the impression of one single individual. The **ground surface**, **wall materials**, and **trees** were among the most memorable elements of urban environments on land. But in water or in the typhoon shelter, the **most memorable elements are the canvas and water surface**.

The **traces of the past** evoke the memories more easily. The things we frequently used, like chairs and door, and with special meanings (like old trees, churches and graves) can be used to compare with the new that make us feel the **pass of time**.





# LIVING ON WATER

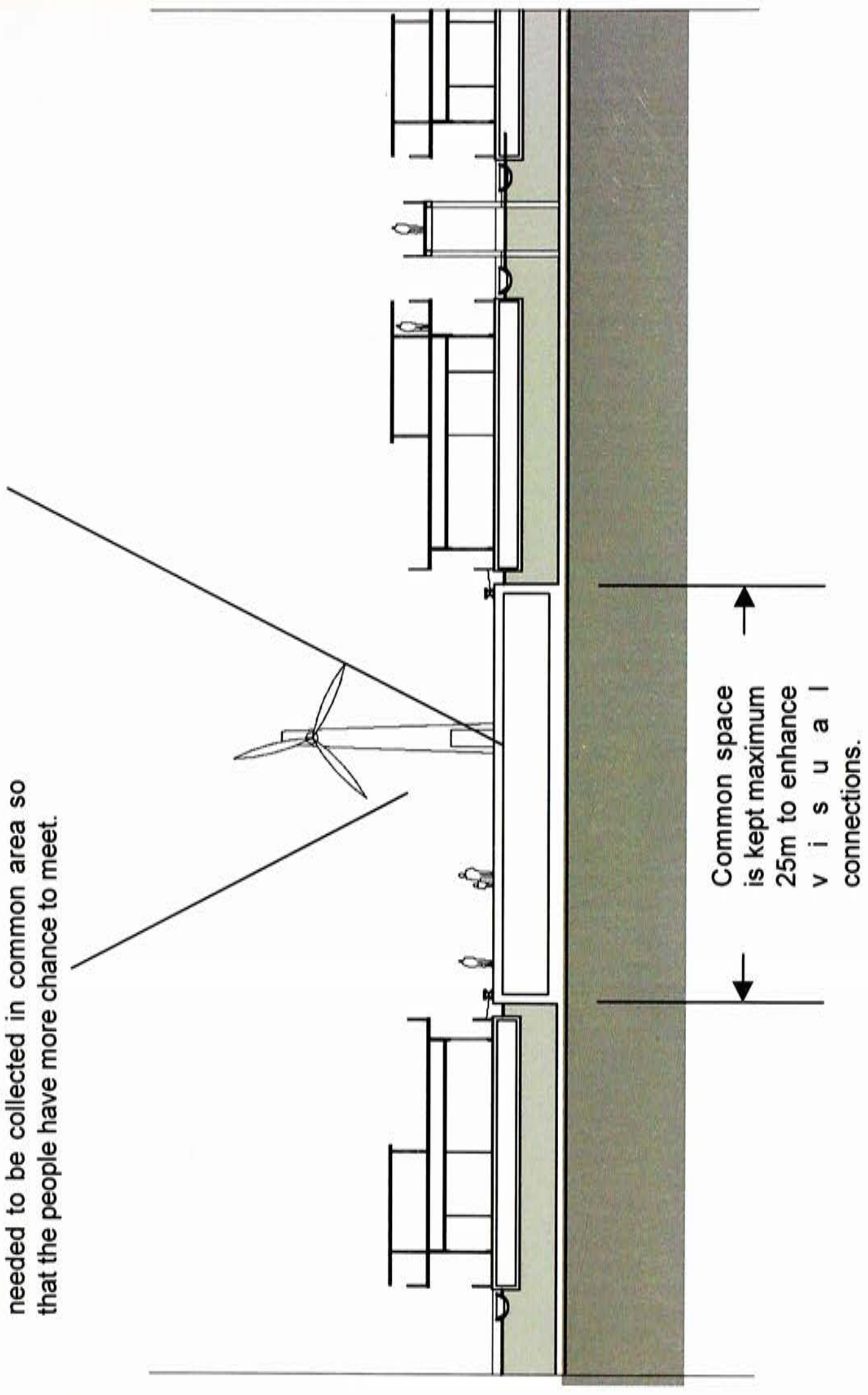
## Preliminary Design

### Visual Scale

Scale is the relationship between the individual and the surroundings. We can recognize human figure within 120m in a normal situation. Within 25 m, we can know who he is. We can see the facial expression when the distance is within 14m. Normally, we feel intimacy within 12m. 25m is an acceptable human visual scale.

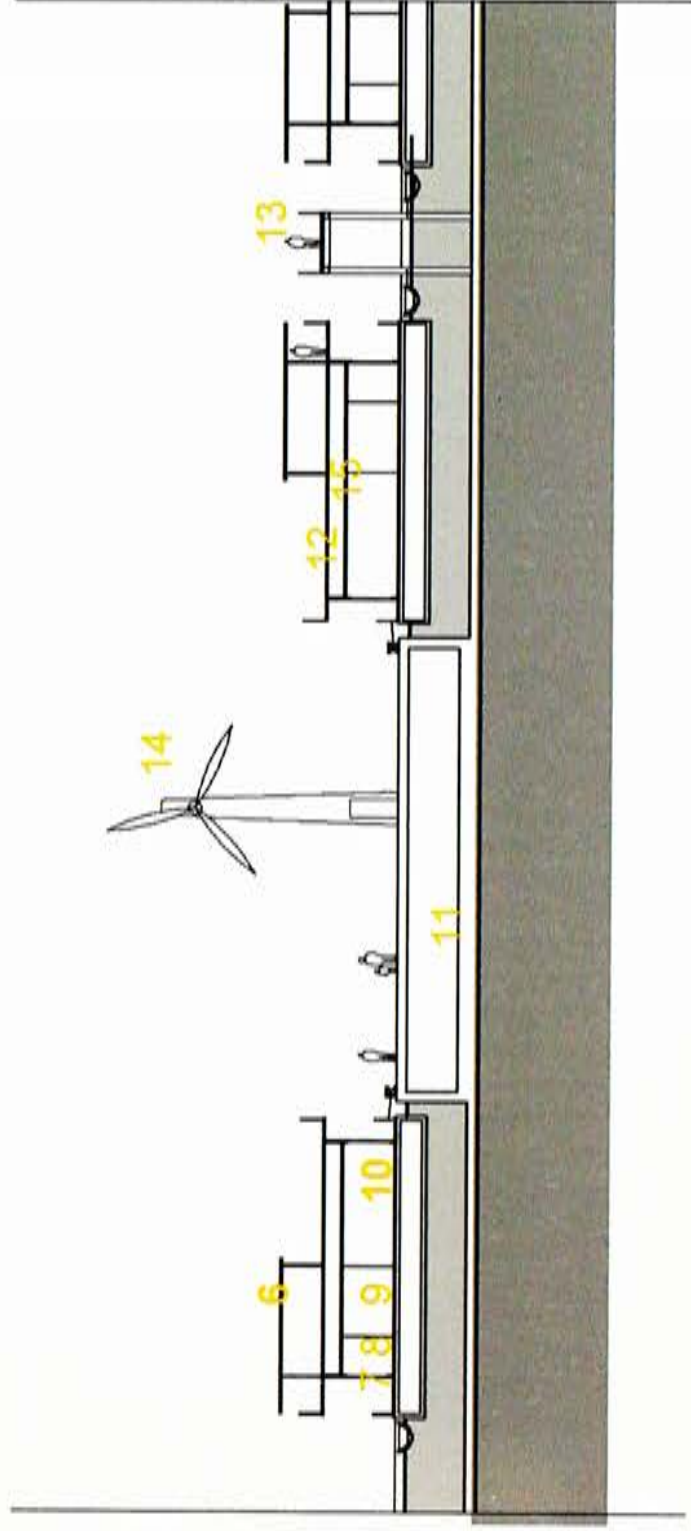
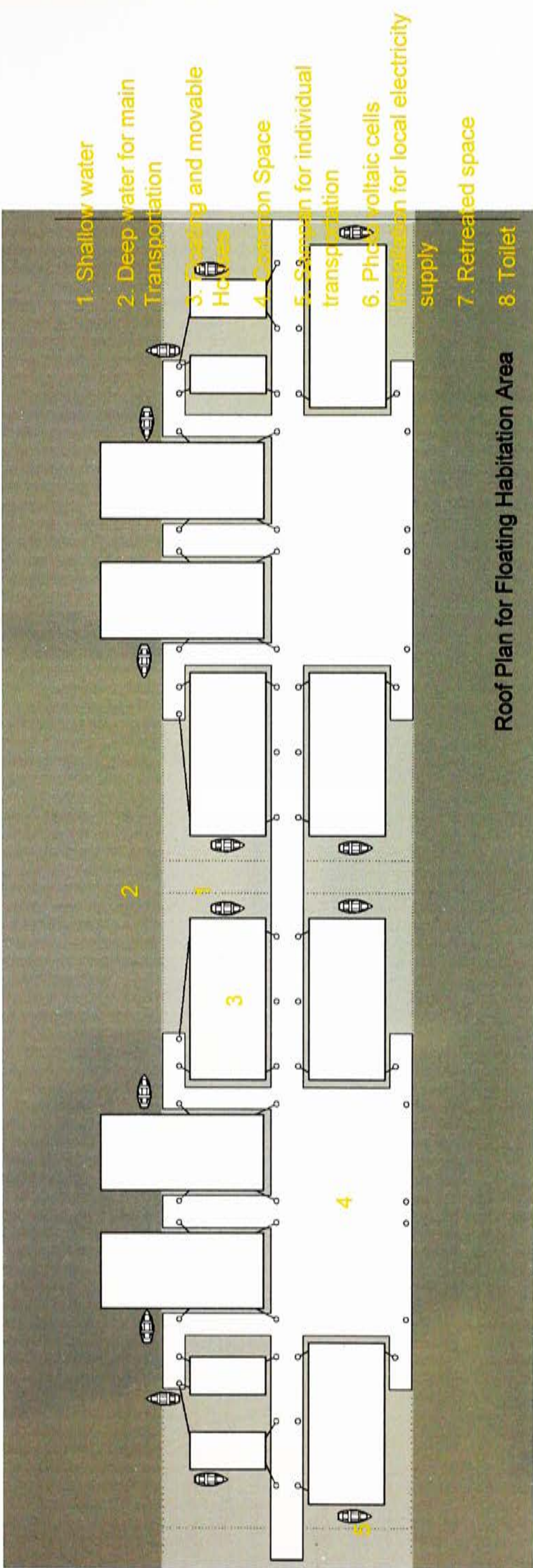
Common space is also a space providing utilities and wind turbine is provided as an alternative energy resources. Fresh water needed to be collected in common area so that the people have more chance to meet.

The hull is also reserved for fresh water storage.





Preliminary Design





THESIS

# LIVING ON WATER

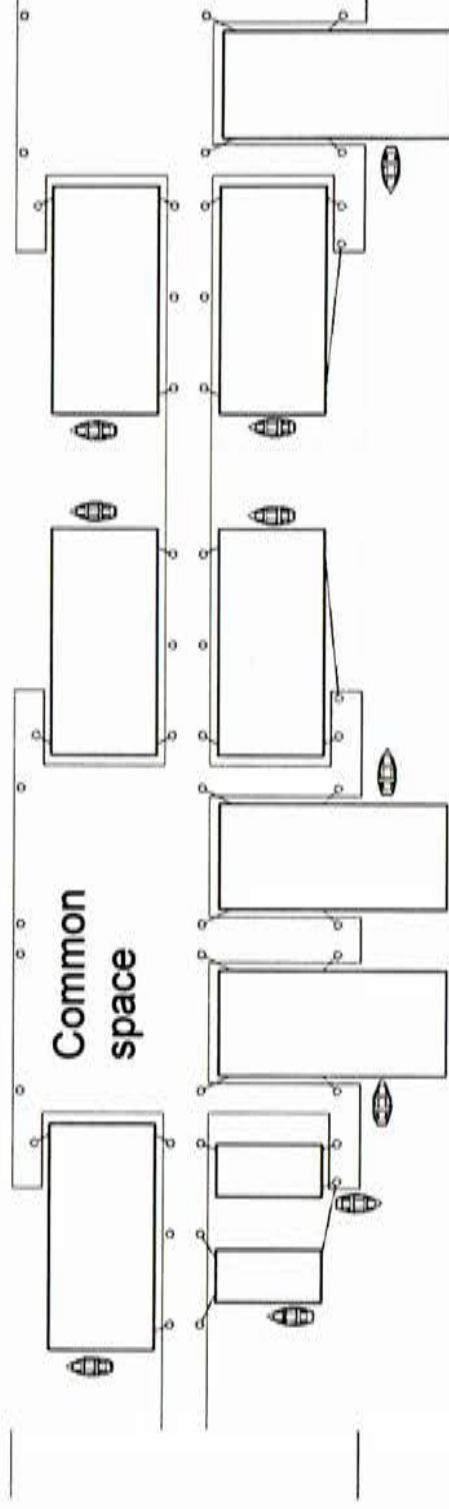
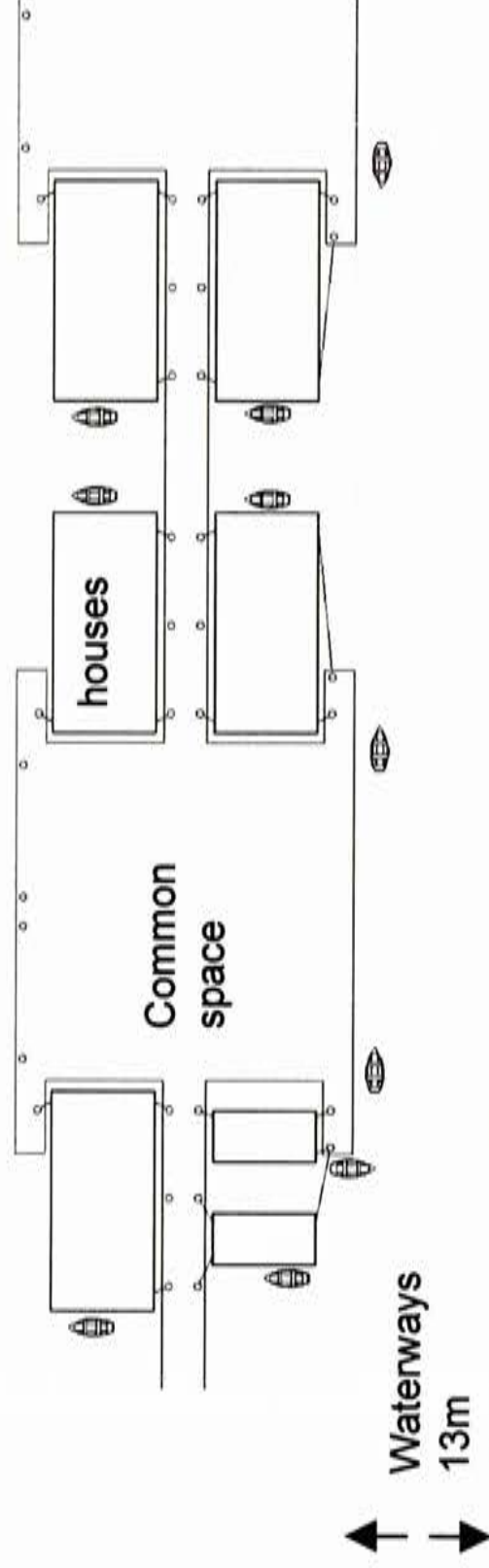
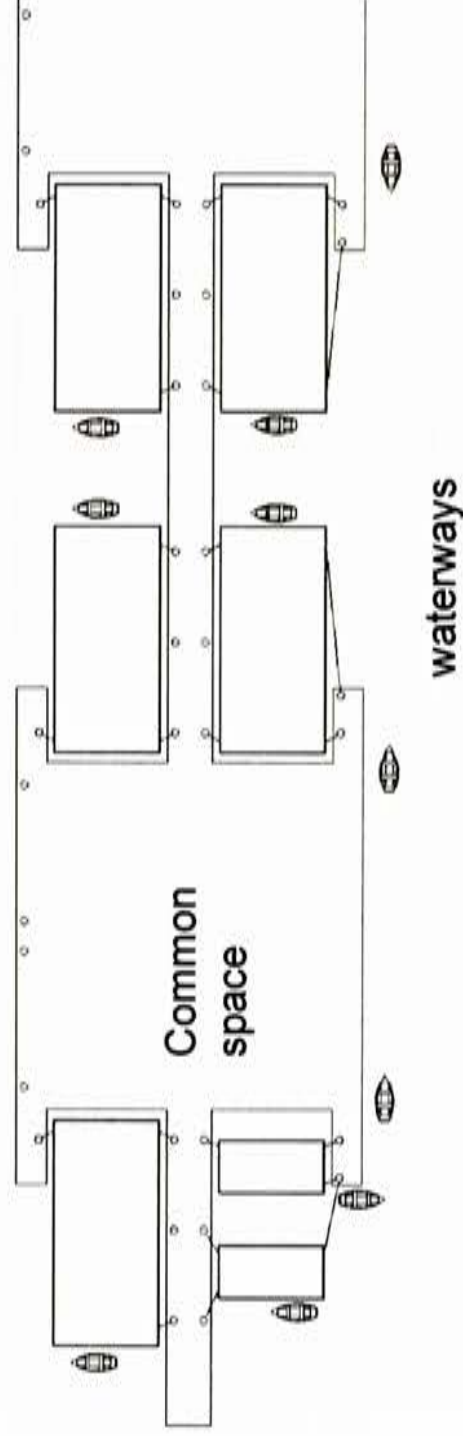
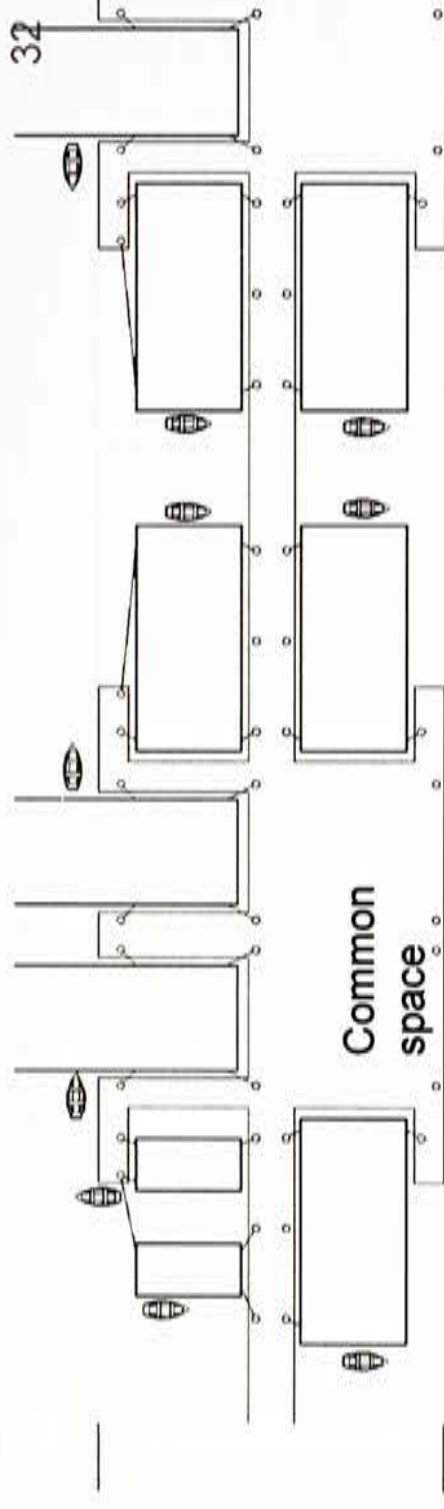
## Preliminary Design

### D / H Proportion of “Waterscape”

It is an important aspect of townscape composition depends on the ratio of street width (D) to building height (H). The concept of D/H has been used to calculate proportions that will ensure sunlight and privacy since the turn of the century.

D/H = 1 is the scale observed in Renaissance City. As D/H rises above 1, the space opens up, and, as it passes 2 gradually become expansive or vast. The D/H of the waterscape in typhoon shelter is near 10. It is the scale introduced by Le Corbusier to make buildings as monumental “figure”.

As the D/H falls below 1, spaces grows increasingly intimate and sense of enclosure, until eventually it is simply cramp as observed in medieval walled cities of Italy.

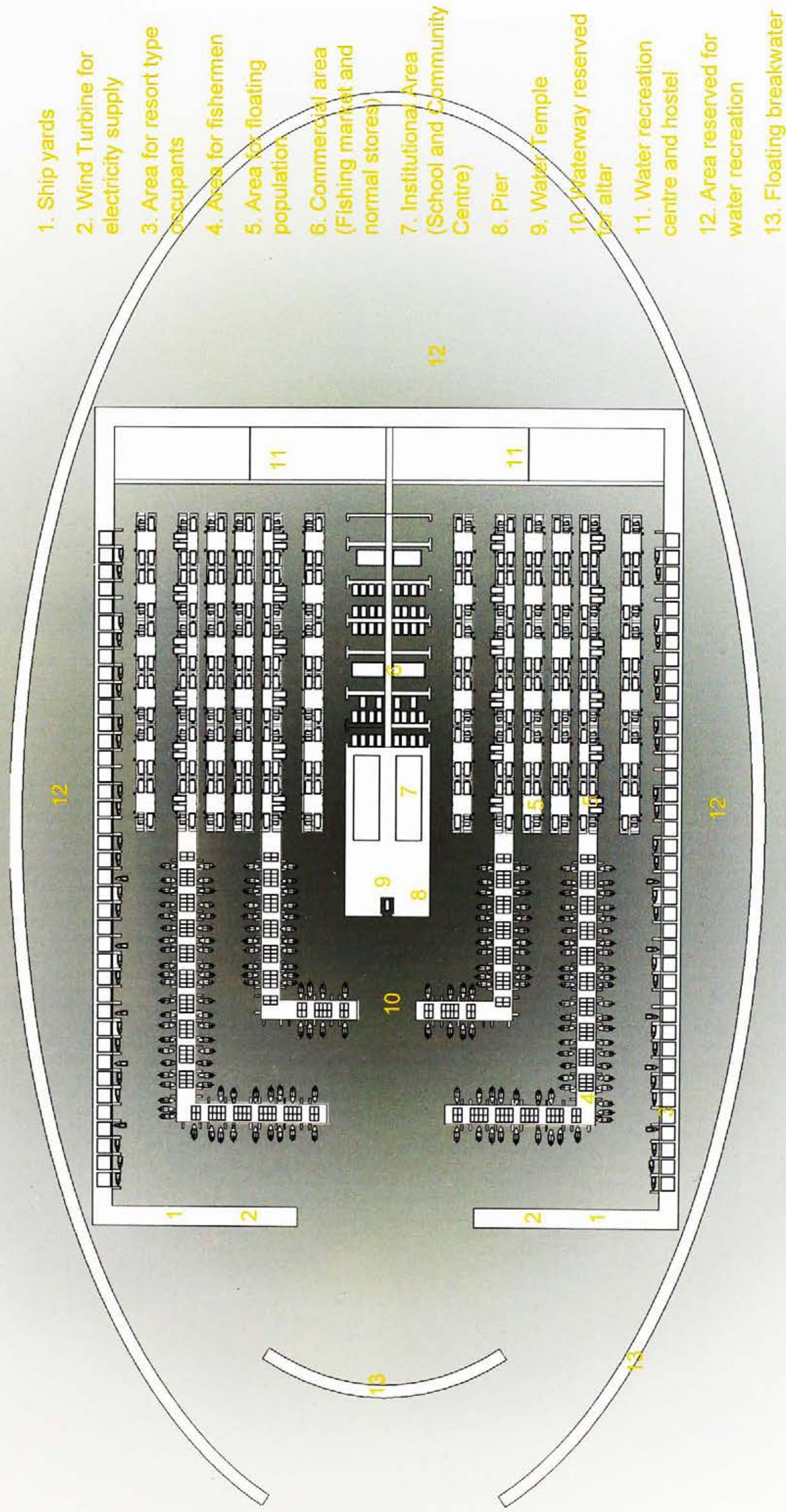


Plan for community planning



Preliminary Design

MASTER LAYOUT PLAN





# Design Proposal



# LIVING ON WATER

## Design Proposal

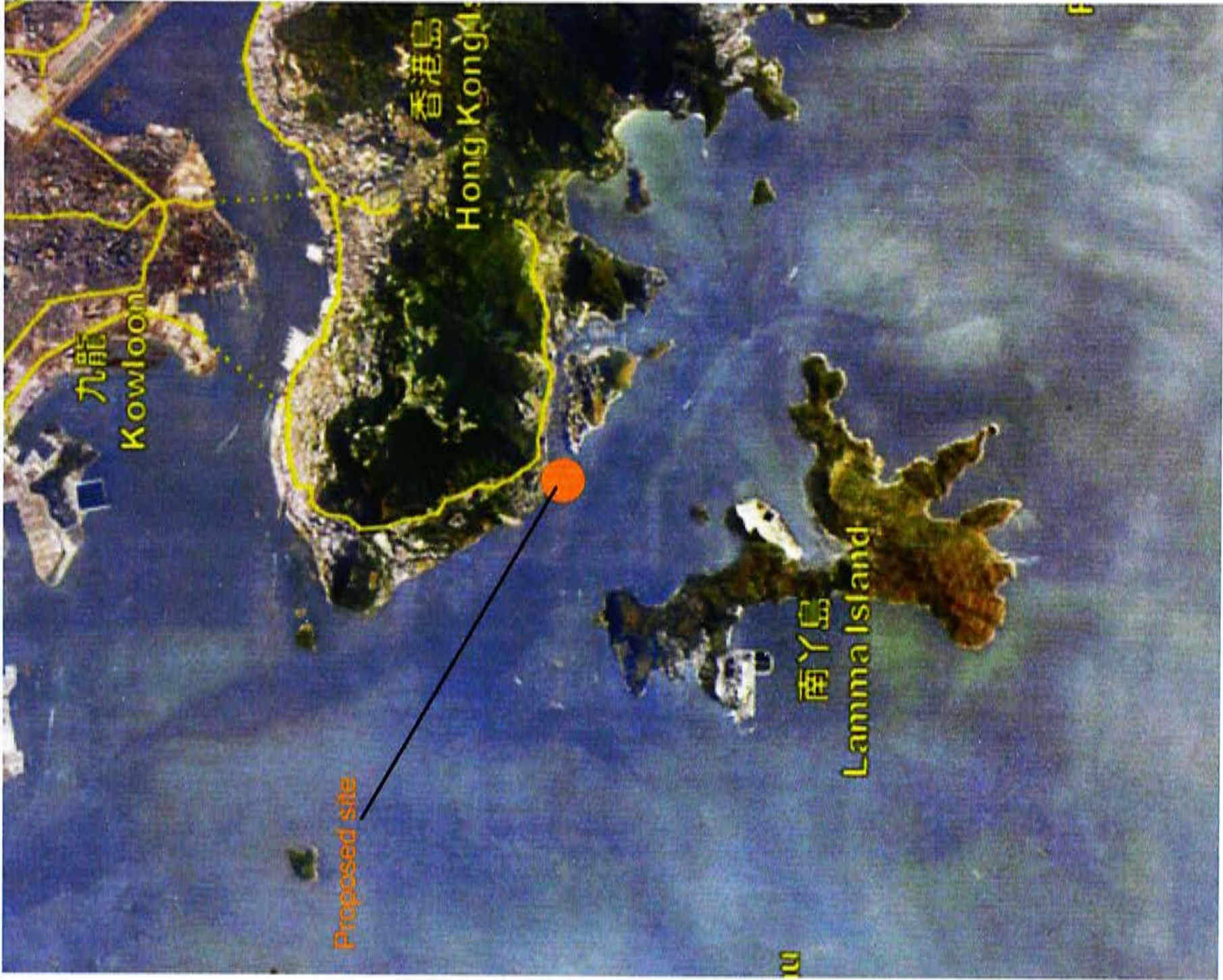
### Site

The idea will be demonstrated in Hong Kong since it is one of the cities related much to water. **The typhoon shelters** are the existing areas with rich context of the **floating communities** where how people live on the water can be observed. But these special communities are diminished by the need of **reclamation**.

The **site** is proposed between Lamma Island and Aberdeen. It situates between Wah Kwai Housing Estate and Magazine Island. It,thus, acts as an **extension** of existing Aberdeen typhoon shelter and a **bridge to forming a cluster** of all fishing and floating communities. This is an area for tourist attraction for both distinct culture and water-related recreation. The proposed site will not ruin the existing condition of Aberdeen Typhoon Shelter.

The design is to deal with the existing **floating population** and also the **temporary visitors** from land for **leisure** to inject the new blood into the flooding shelter to keep the community survival.

Thus, apart from living quarters for the floating population, **tourist facilities** ( hostels and water sport facilities) for land people will be provided for the communities. **Pier area** is also introduced for the visitors and the floating people to get the easy access to land.





# LIVING ON WATER

## Design Proposal

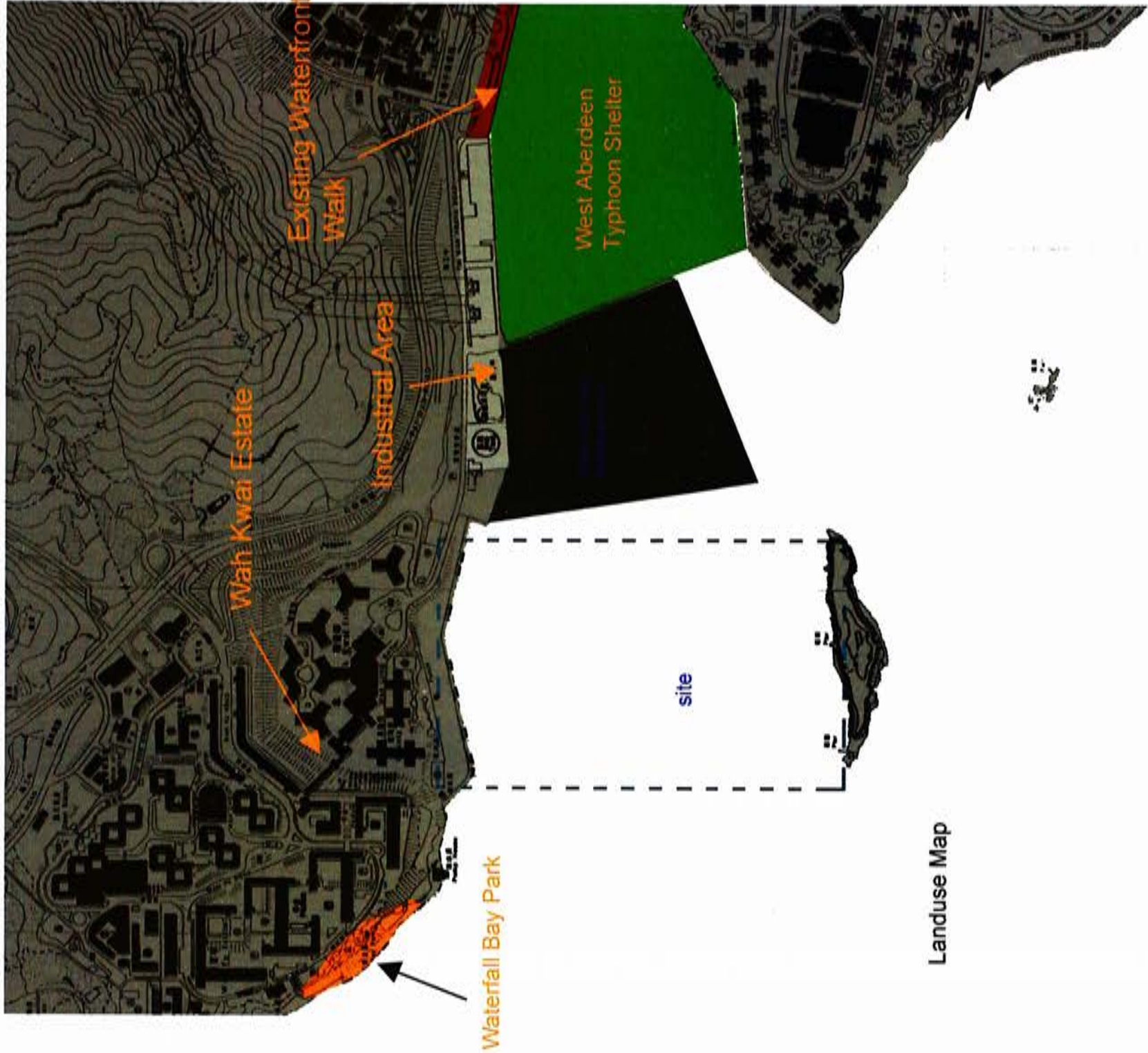
### Site - Analysis

The site is located between Wah Kwai Estate and Magazine Island. On East side, there will be a cargo handling area is planned. At the water front of Wah Kwai Estate, there is a abandoned grassland which is not planned for any propose.

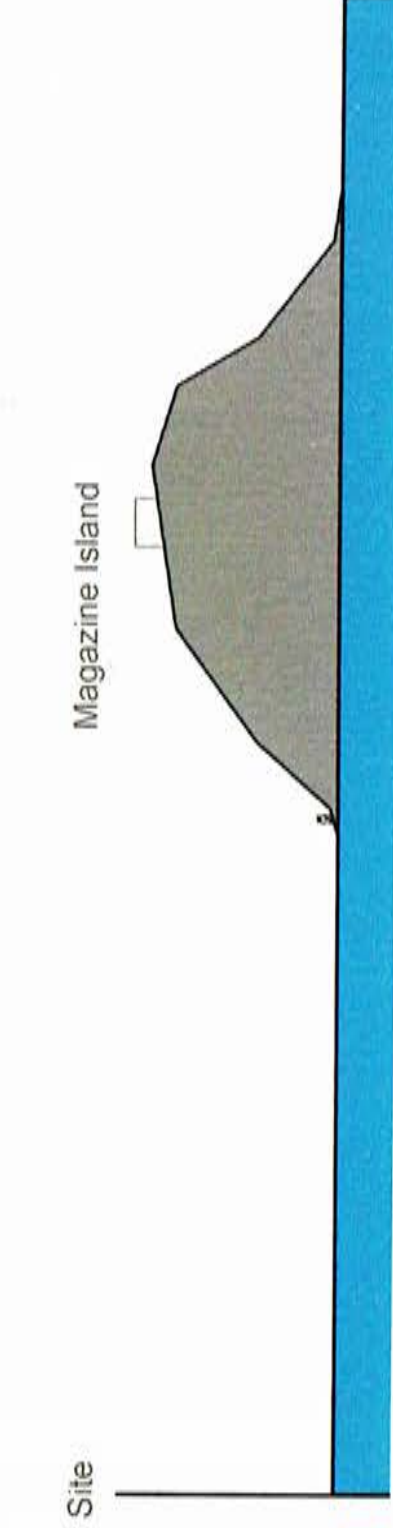


Wah Kwai Estate

Site Section



Landuse Map



Site

Magazine Island



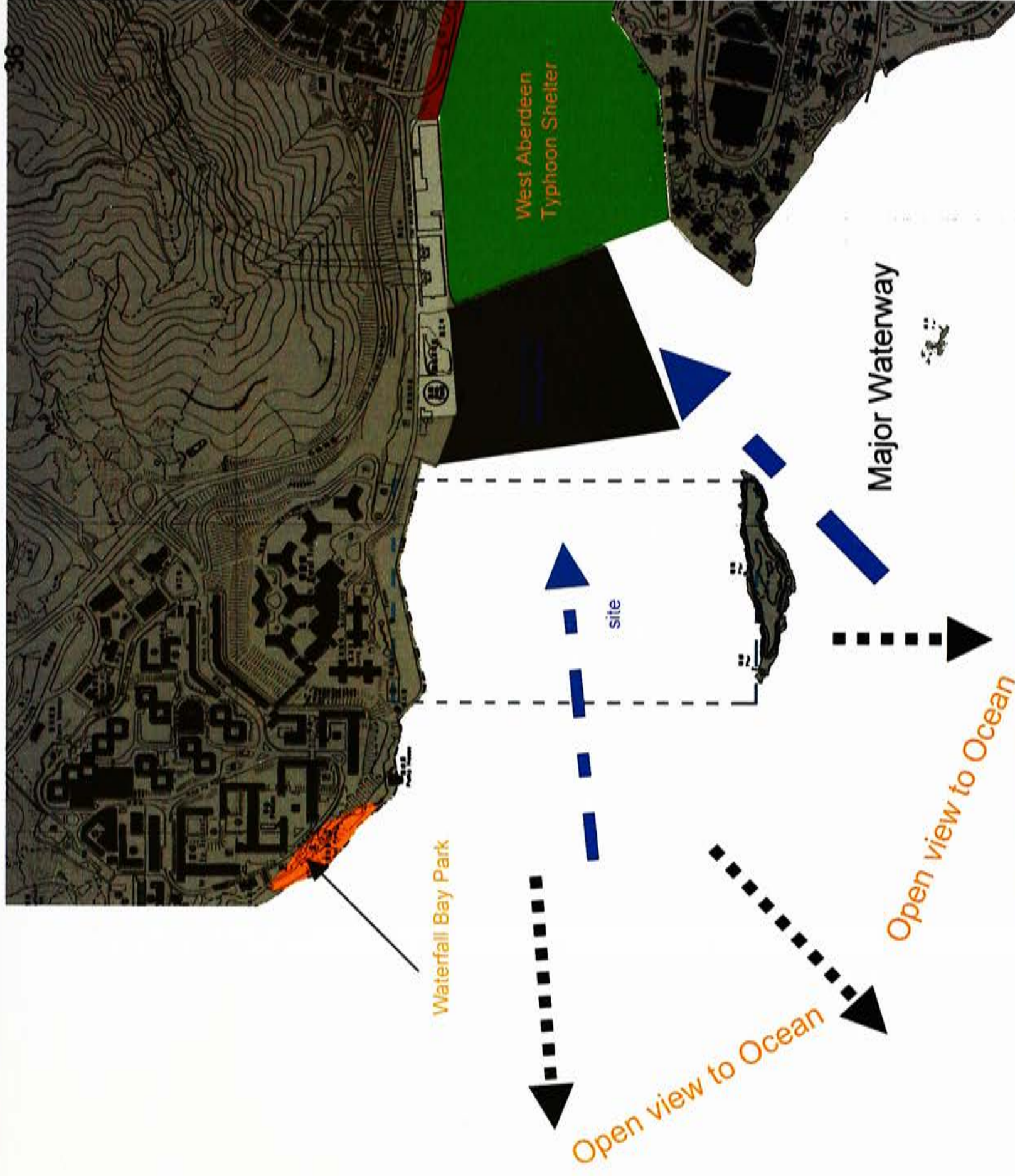
# LIVING ON WATER

# Design Proposal

## Site - Analysis

The Site has tremendous views towards ocean. On the west end of the site, there is a park constructed with different Gods to protect people from being drowned by the wave. There is a place where the illegal immigrants from mainland China land but most of them are drowned by the ocean. Thus, people place different Gods here to protect people from drowned by the sea.

The waterfront walkway from the Aberdeen Typhoon Shelter is blocked by the industrial area. The connection from the existing typhoon shelter to the site is terminated.





# LIVING ON WATER

## Design Proposal

### Defining Programme

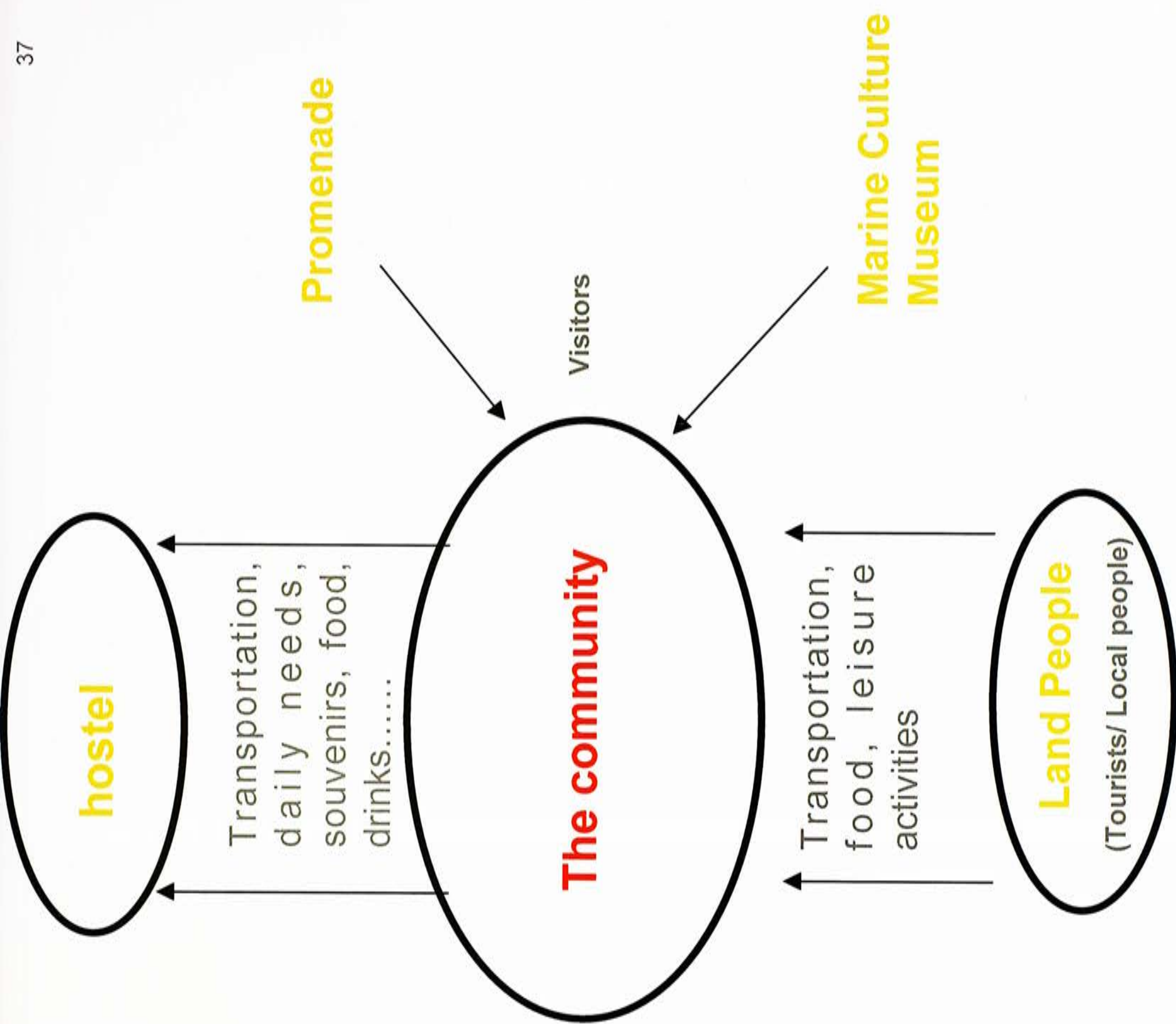
To design a community, it is important to design the environment where they can seek for opportunity to earn a living and to get the daily necessities.

The floating community attracts the **tourist** very much since it is a very distinctive culture in Hong Kong. It provides job opportunities in **water transport** and other **commercial activities** for the community. A **hostel** will be introduced into the community to provide this tourism opportunities.

Means to introduce more visitors into the site is also important to provide chances for the community to interact with other people.

Tourist attractions:

- special kind of living which is different from land
- special cultural experience
- leisure activities with water
- It should provide easy access to the land.





# LIVING ON WATER

## Design Strategies

### Social needs

-an interacting population of various kinds of individuals in a common location

### 1.All the social activities and exchange happen on a common location.

-The existing social activities between the people from the land and the floating people is at the edges that the most favorable location is near the pier where provides access for both people from land and sea.

-among the floating people, the interactions usually happen on the **floating platform** (in form of a transportation boat or a very raw platform) next to the boat houses.

### 2.Time factor

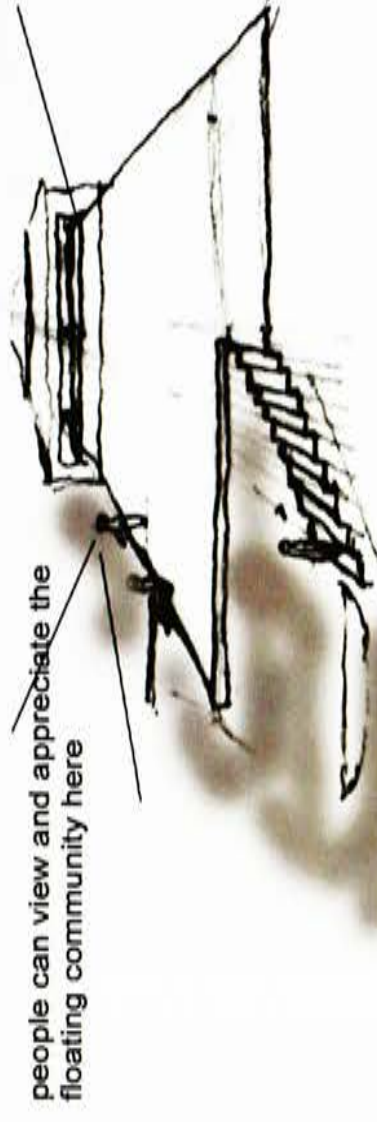
-It needs time to favor the social activities to be happened

### 3. Visual Scale

Scale is the relationship between the individual and the surroundings. We can recognize human figure within **120m** in a normal situation. Within **25 m**, we can know who he is. We can see the facial expression when the distance is within **14m**. Normally, we feel intimacy within **12m**. **25m** is an acceptable human visual scale.

### 4. Size of the community

Size of community should be kept small so that people will know each other better. And a sense of security will thus provoked.



Time consuming activities

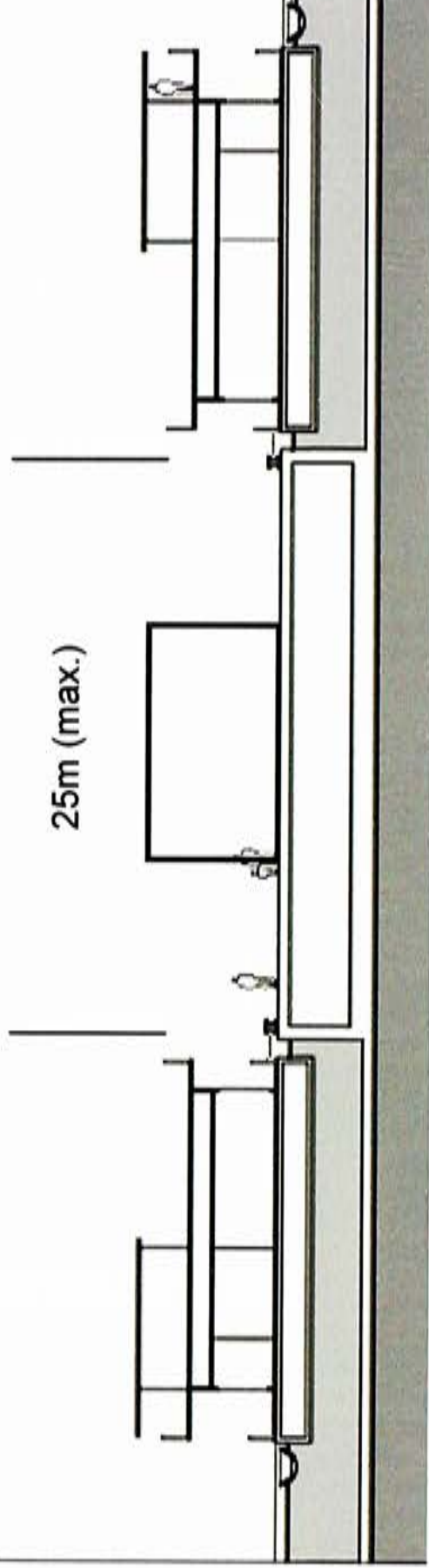
(fishing, buy and sell goods, enjoying foods, viewing and resting)

the pier provides a place for different activities happened



25 m

25m (max.)



Platform not only provides a place for common activities to be happened, but also acts as a place for interaction among the small communities.





# LIVING ON WATER

## Design Strategies

### Psychological needs

- "a group of people shared with a common characteristic and experience living together within a larger society so that a sense of security and belongings is provoked."

**1.Experiences or memories are always shared by the people in form of images, not the impression of one single individual.**

-in water or in the typhoon shelter, the most memorable elements are the boats and water surface.

**2.The idea of floating and movable implies certain degree of self-contained.**

Try to keep the boats as the only alternative transportation to enhance the relationship with the water surfaces.

Enhance the images by simulating the form and properties of the boats and water surfaces.

The concept of environmental friendly designs help the community can be self-contained in certain extent.



Form of the boat and the uniqueness imply symmetry

The most magical quality of water is the reflection which makes one thing has two images





# LIVING ON WATER

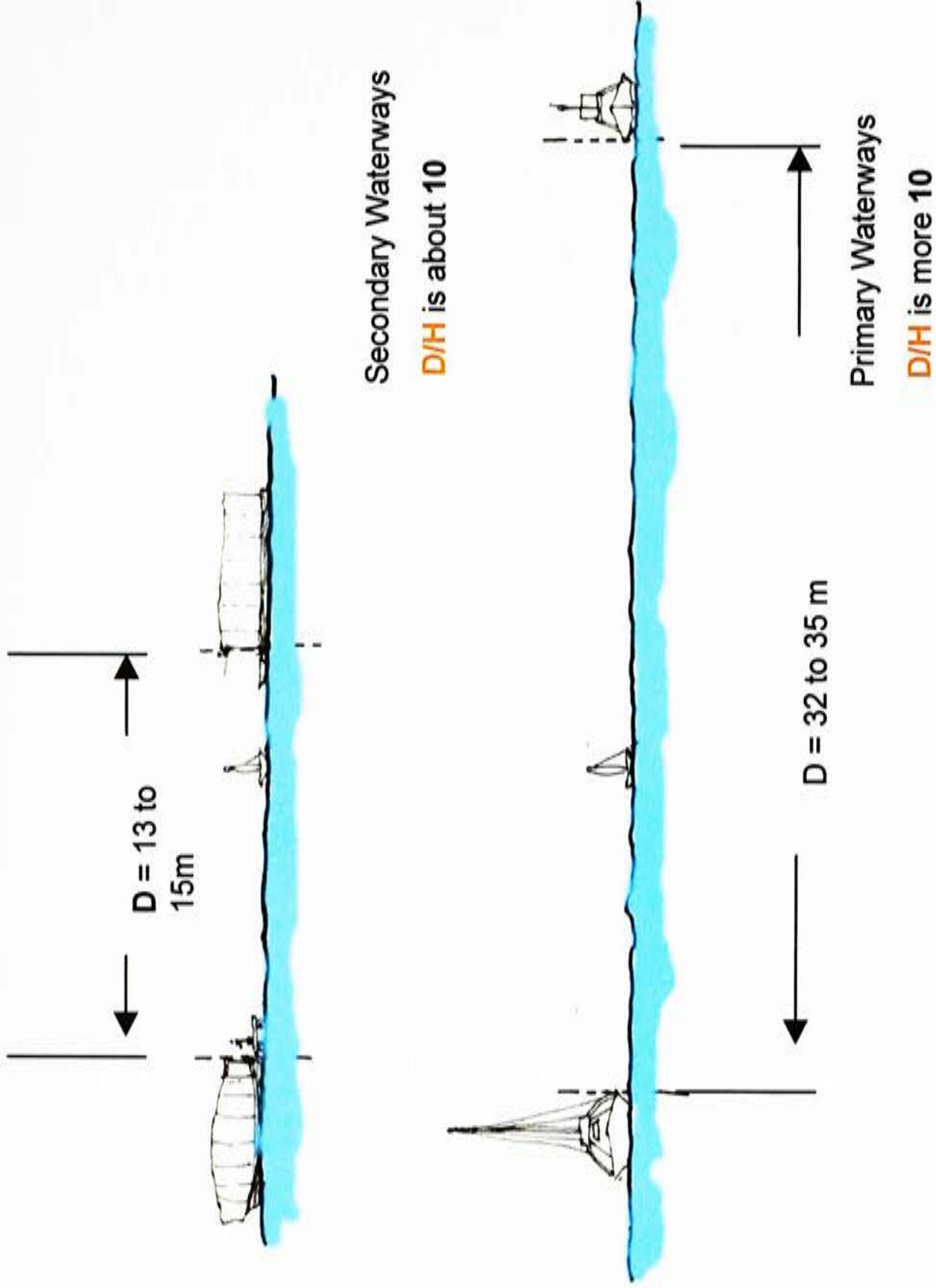
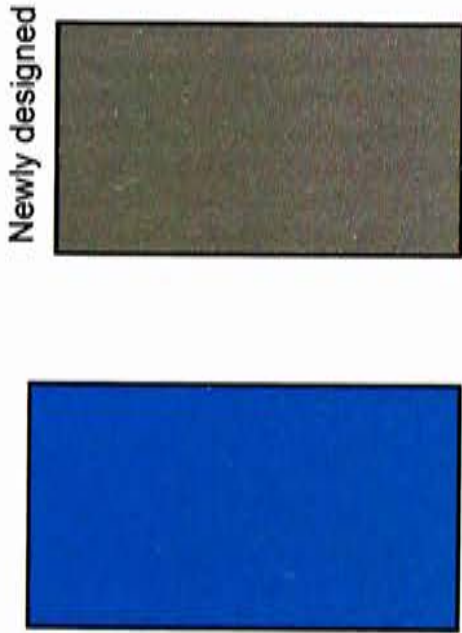
## Design Strategies

3.A sense of place can also be experienced by man to their surroundings either in terms of **scale** or **visual experiences**.

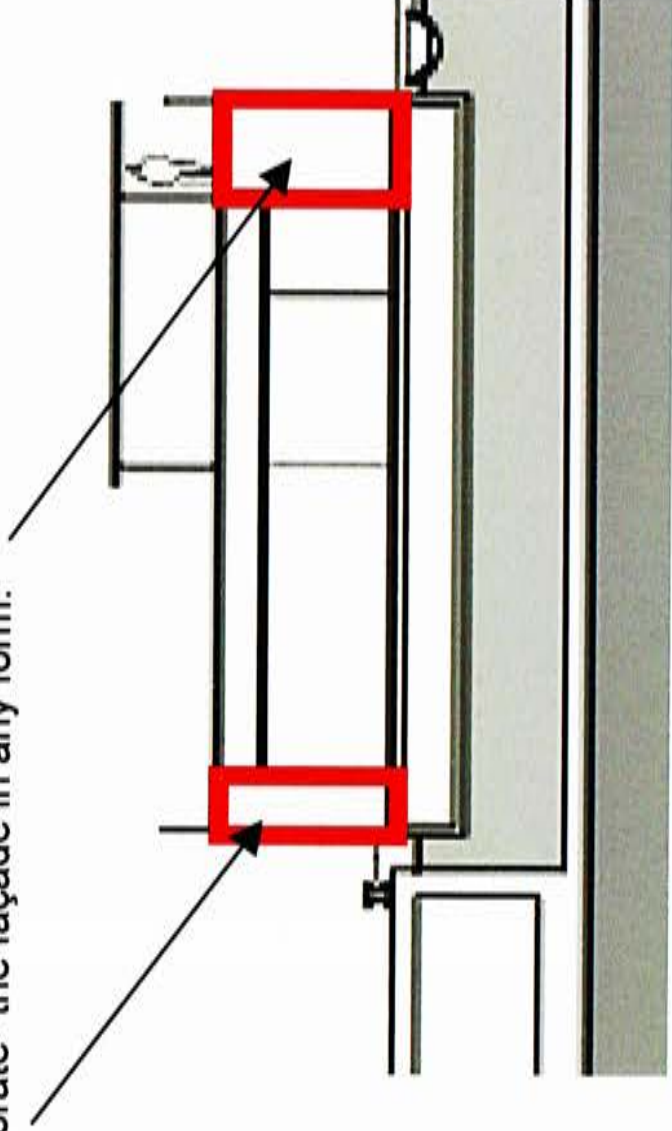
### Visual Experience

- The **colors** and **materials** of the walls help the creation of a special atmosphere. The "motif" of the wall or façade expresses the character of the family and the essence of the technology of the time for the people in that place.
- In the floating community, the different arrangement of the living boats express the **imagination**, **adoption** and **personality** of the individual families although certain common ideas from the past experience will be shared.
- The solutions to live are always in a **minimal** way to fulfill the most **basic** human needs.

Original boat houses will be kept to improve the conditions. It is to preserve the characteristic of the boat houses.



The void spaces are left for people to "decorate" the façade in any form.

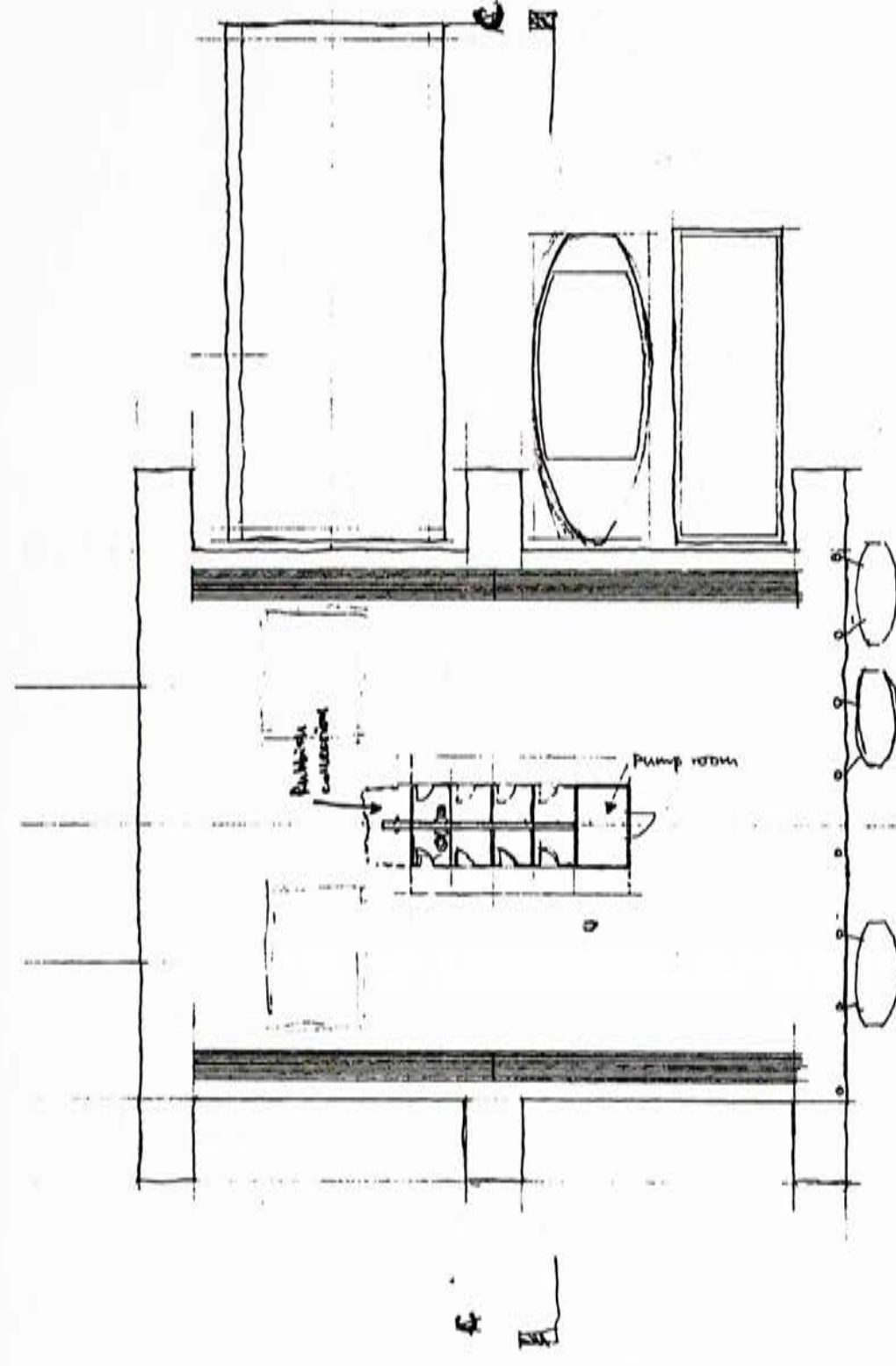




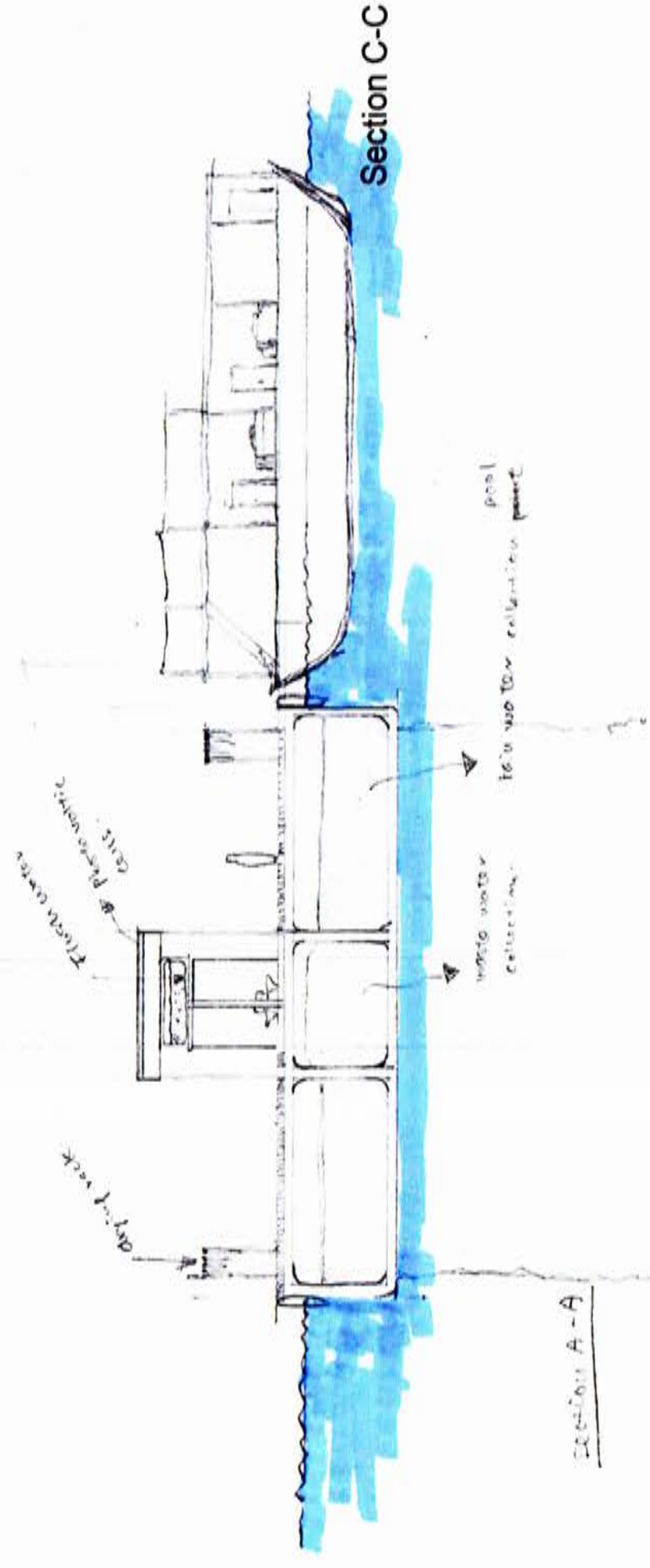
# **D e s i g n   D e v e l o p m e n t**



## Design Development



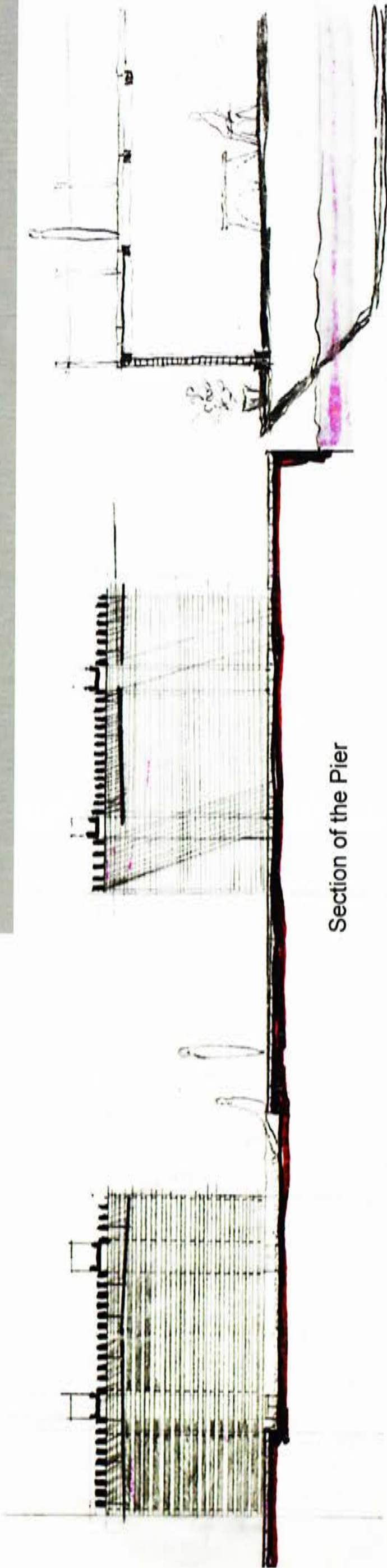
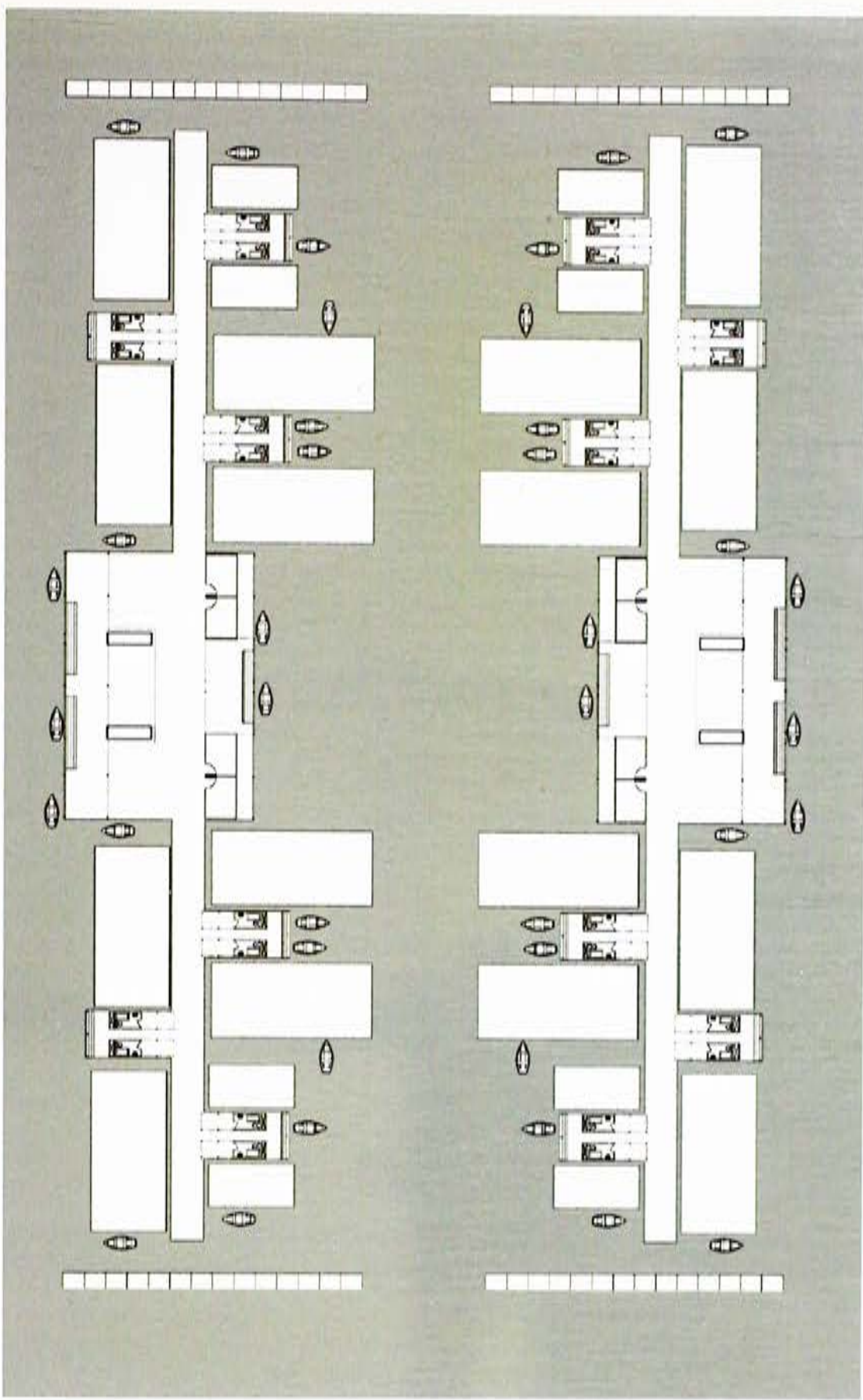
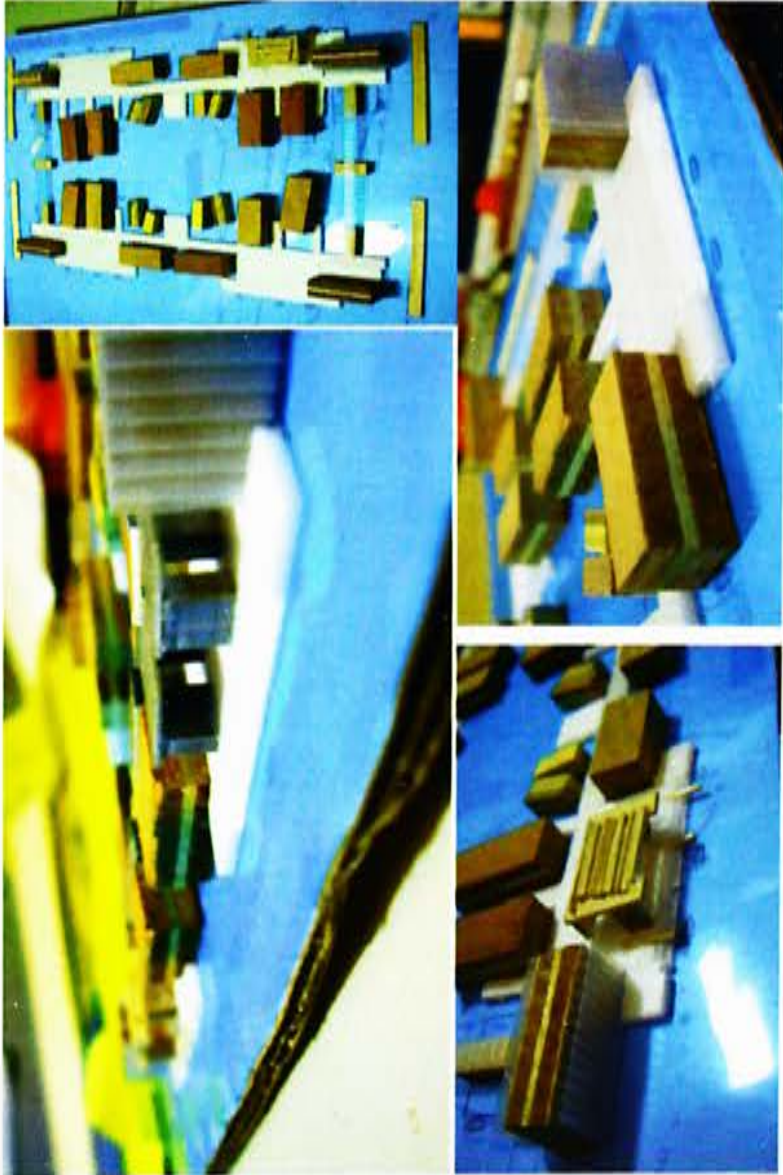
plan for the community platform.





LIVING ON WATER

Design Development

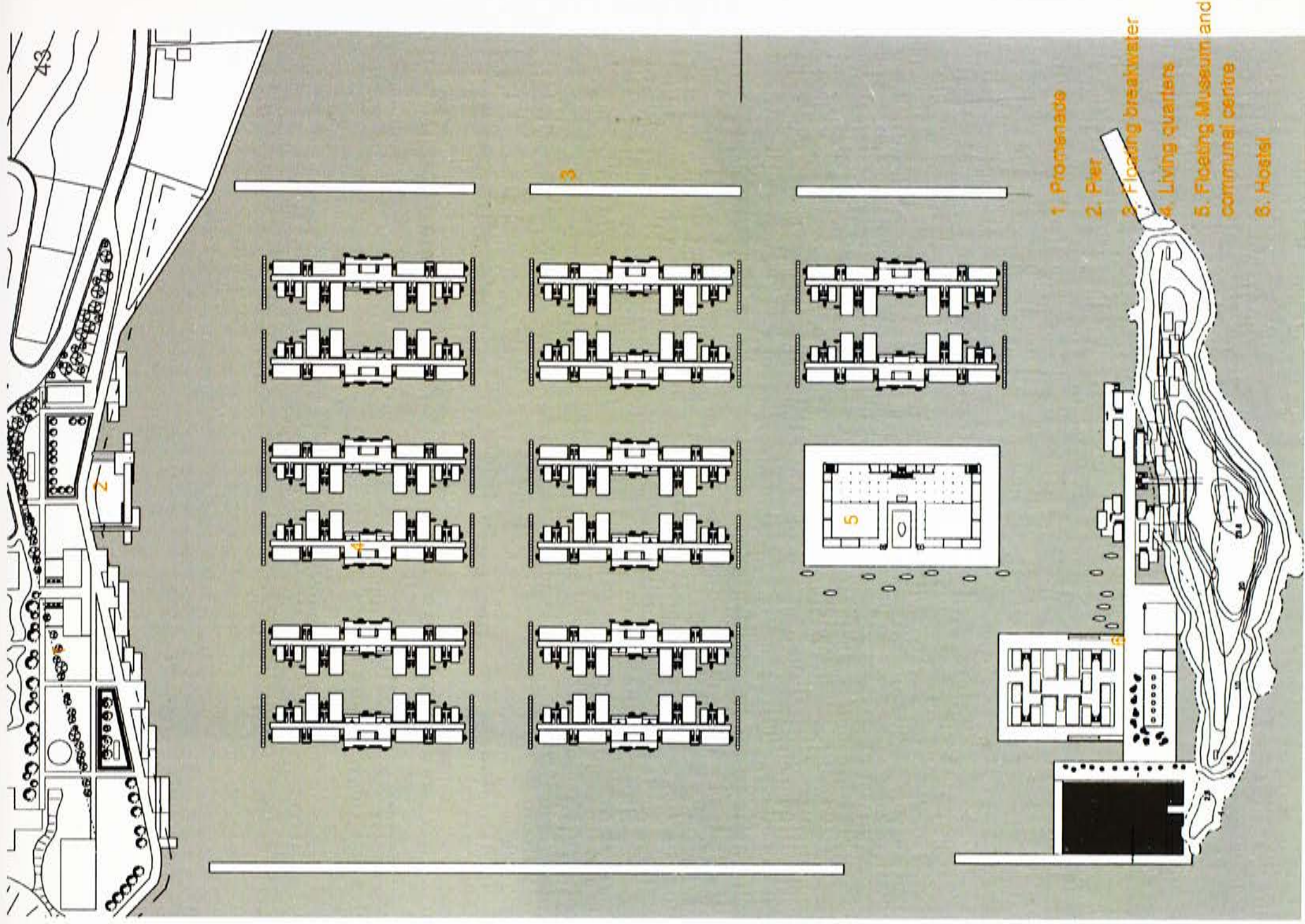
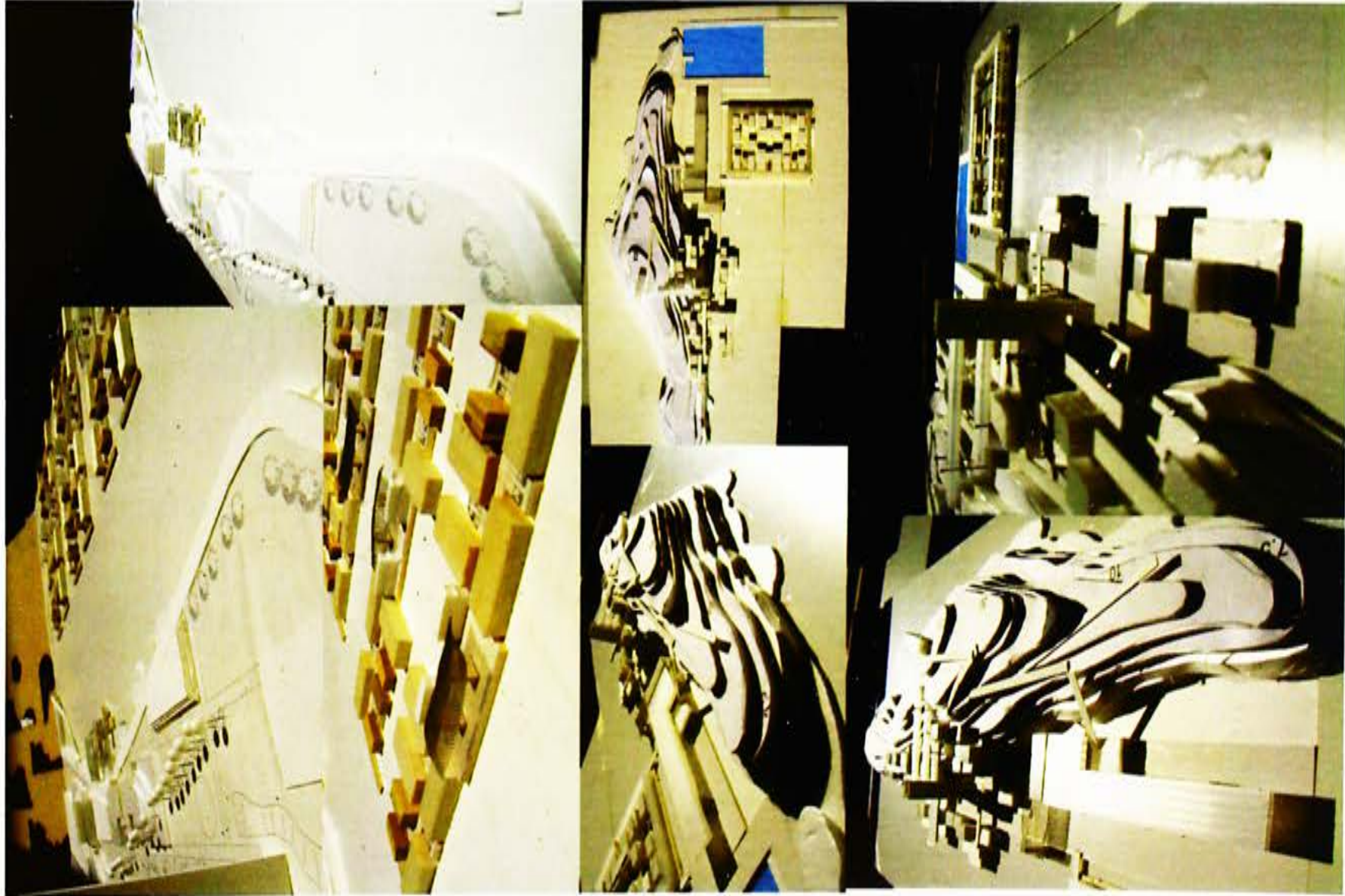


Section of the Pier



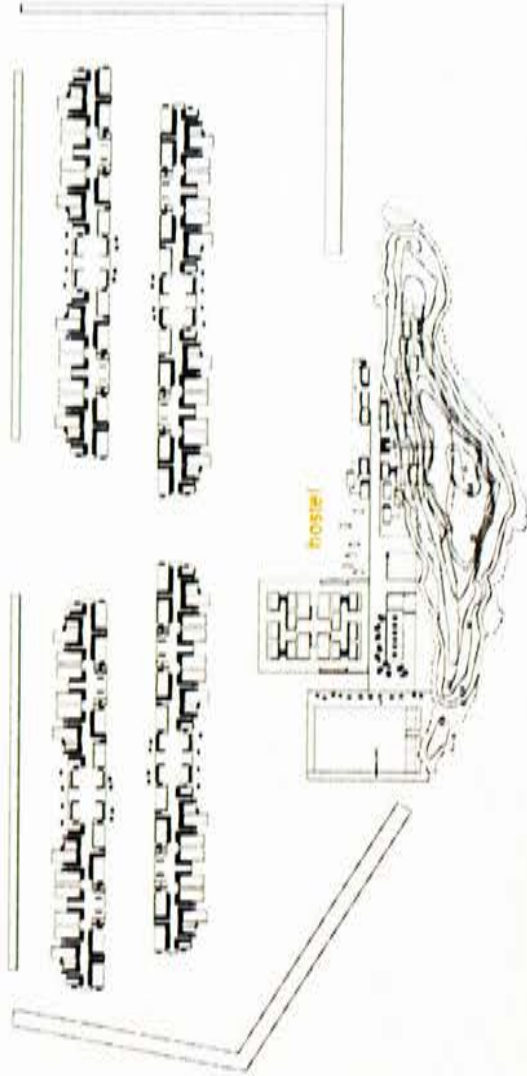
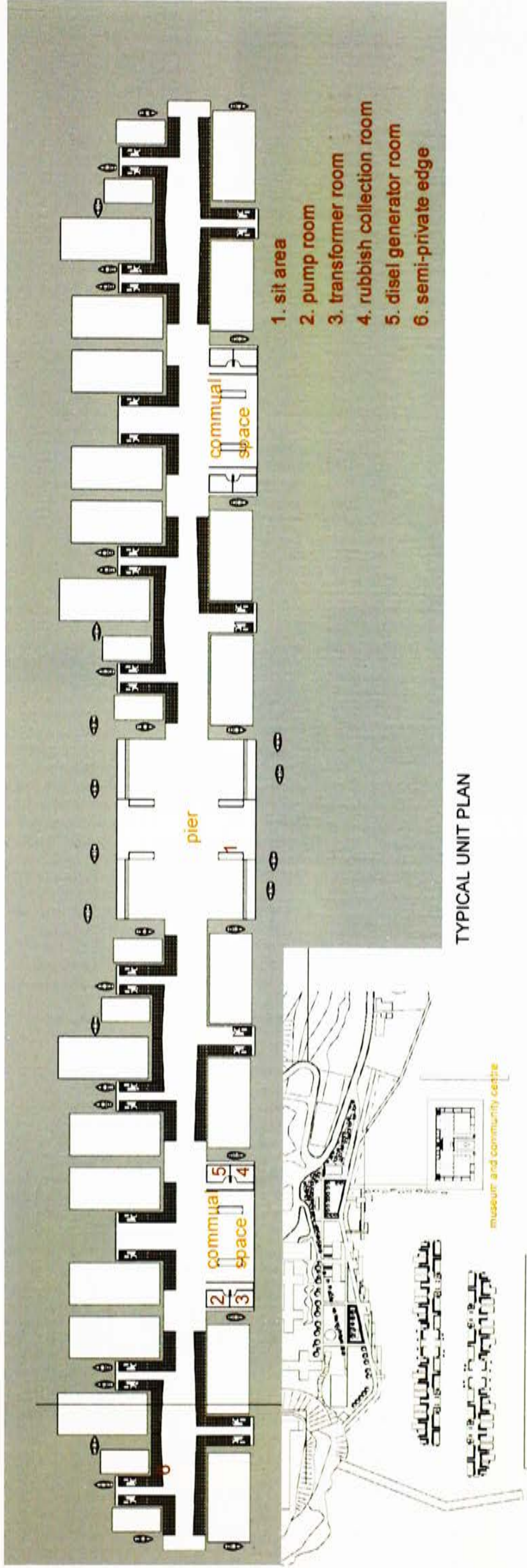
# LIVING ON WATER

## Design Development





Design Development

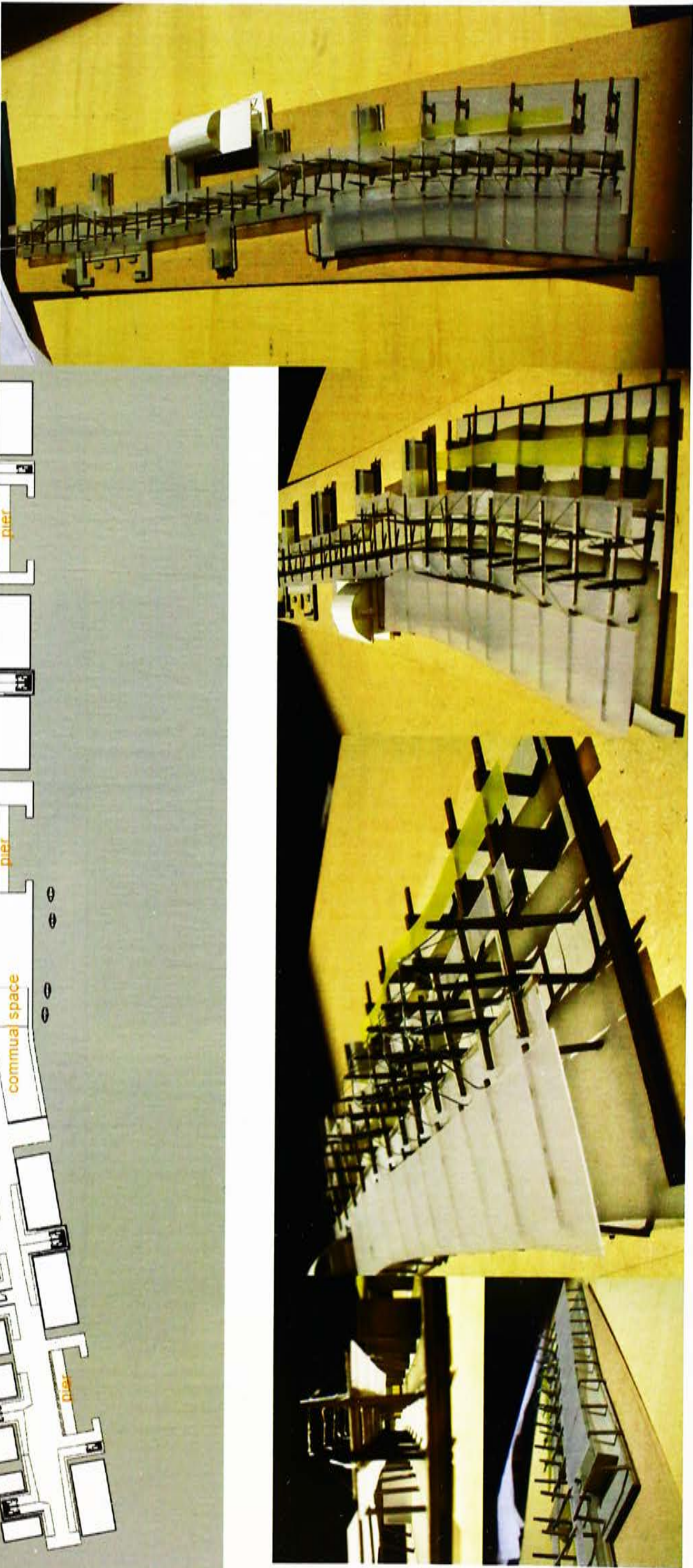
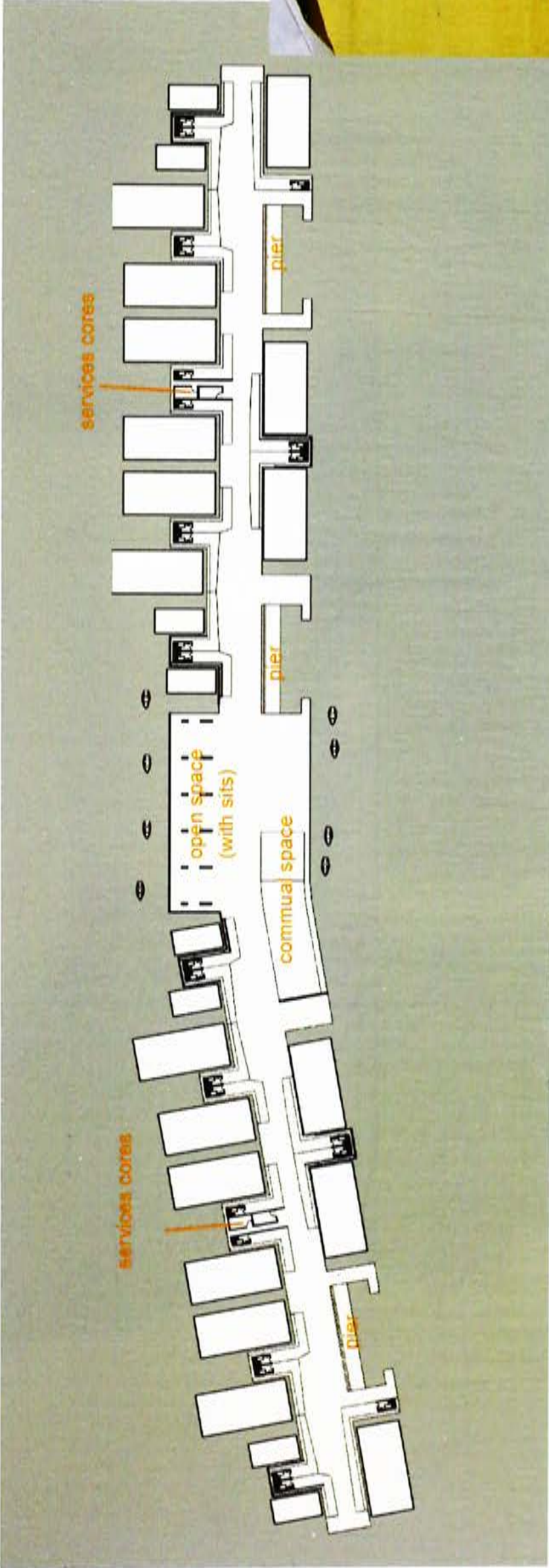


MASTER LAYOUT PLAN

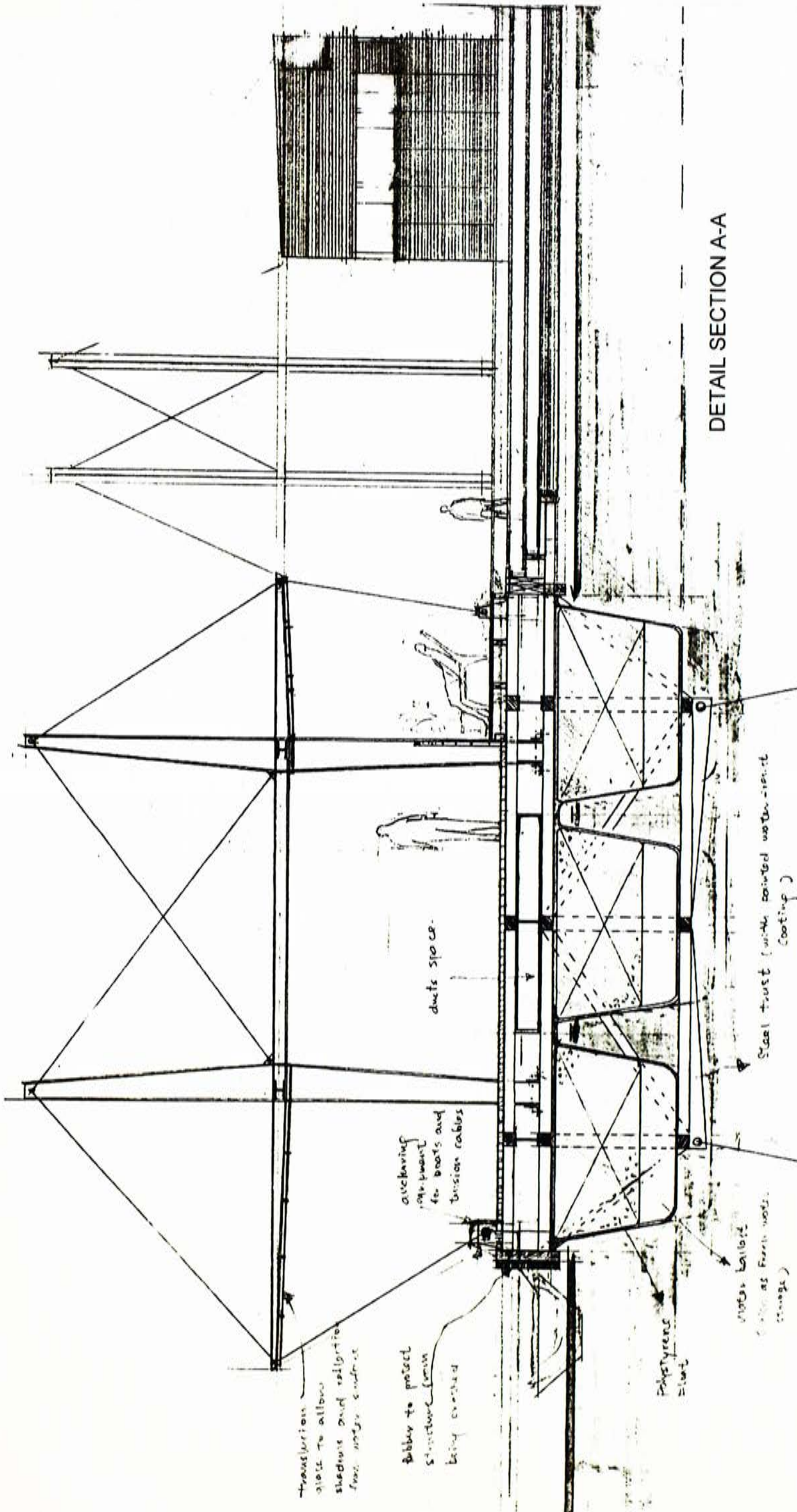
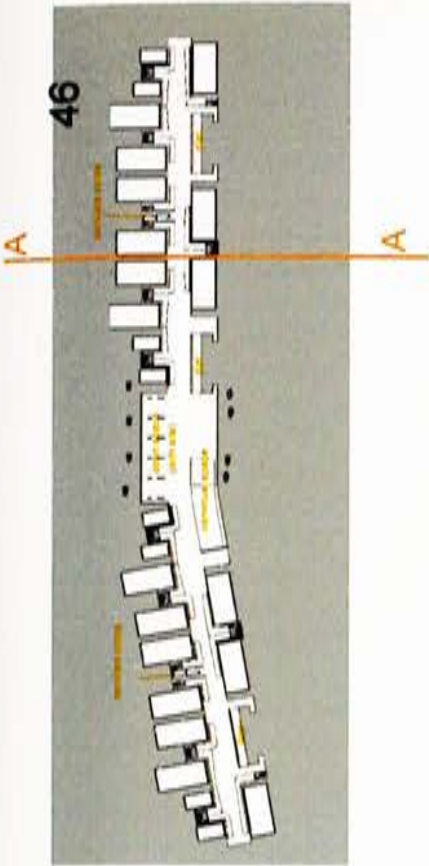


LIVING ON WATER

Design Development





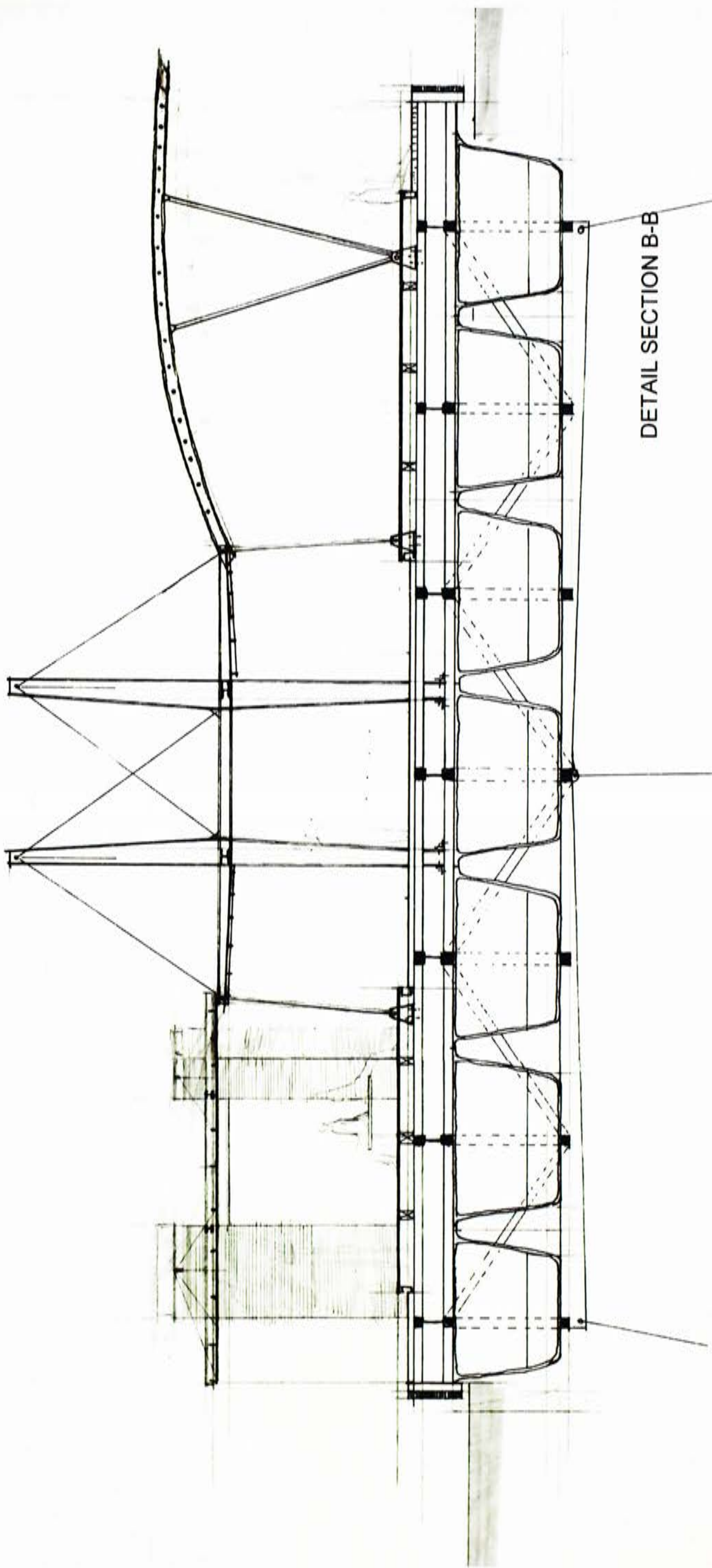
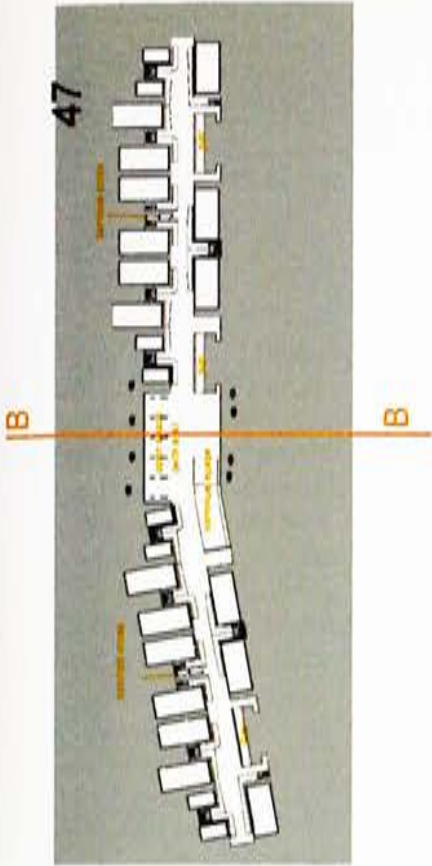


DETAIL SECTION A-A



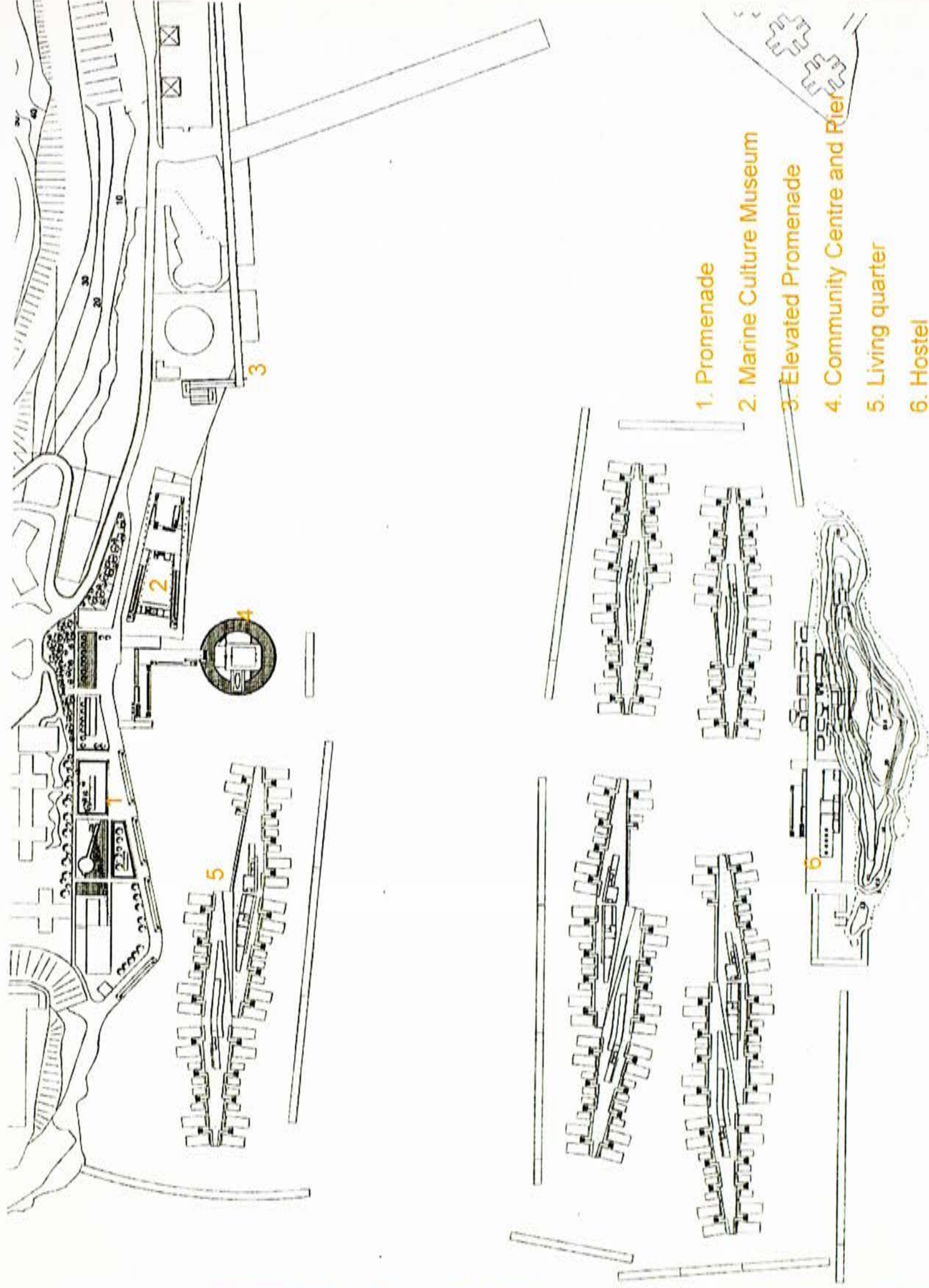
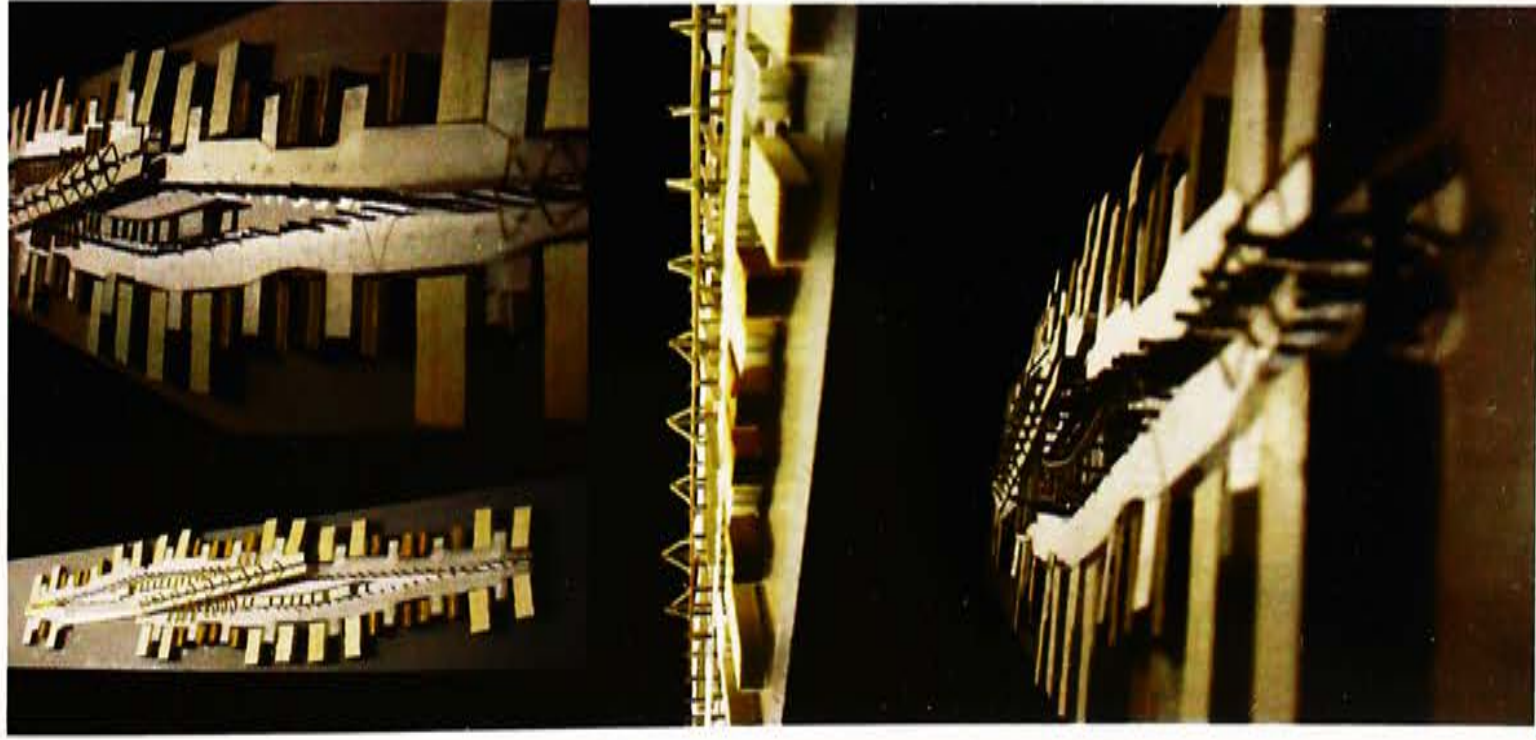
# LIVING ON WATER

## Design Development





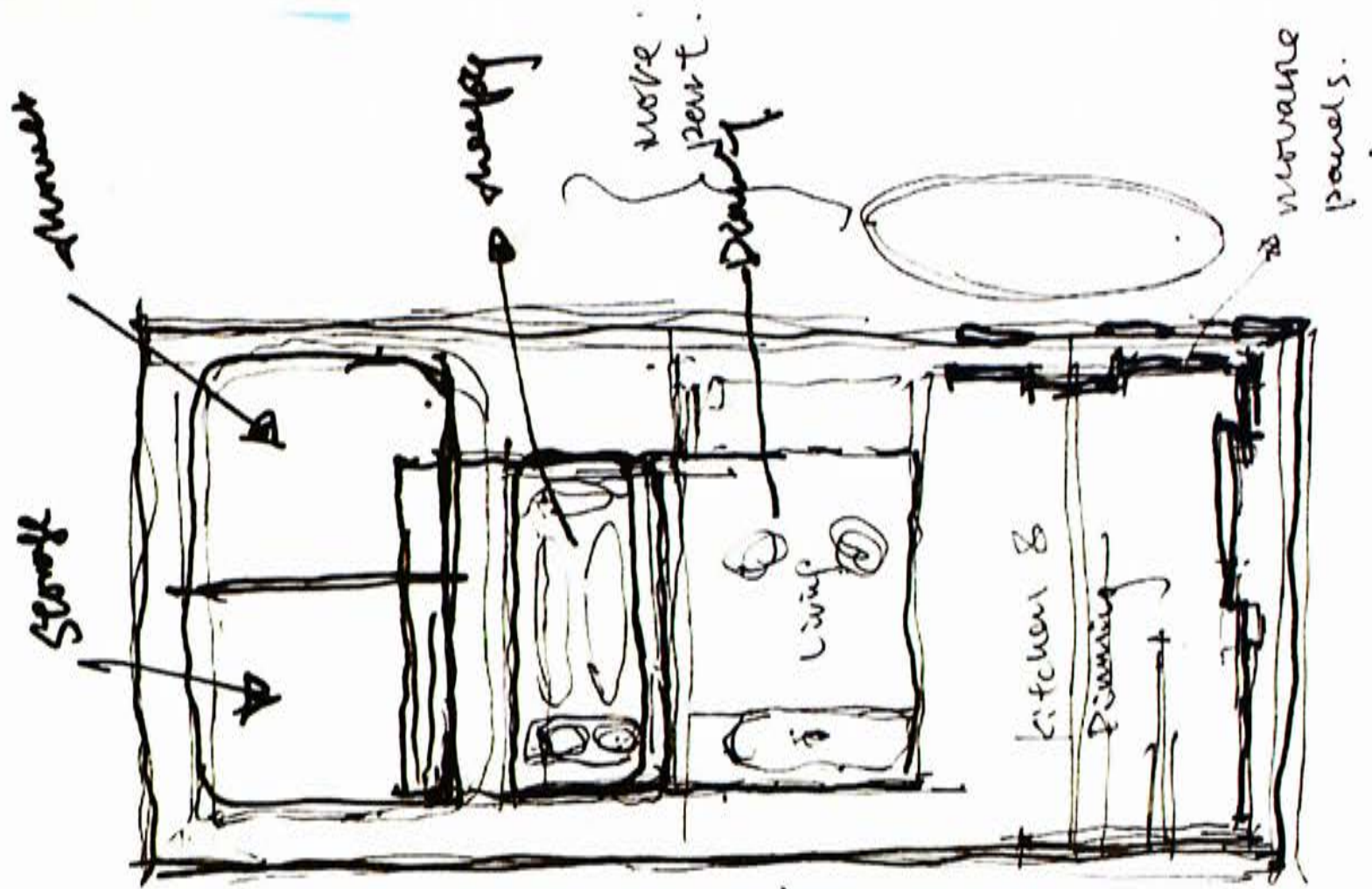
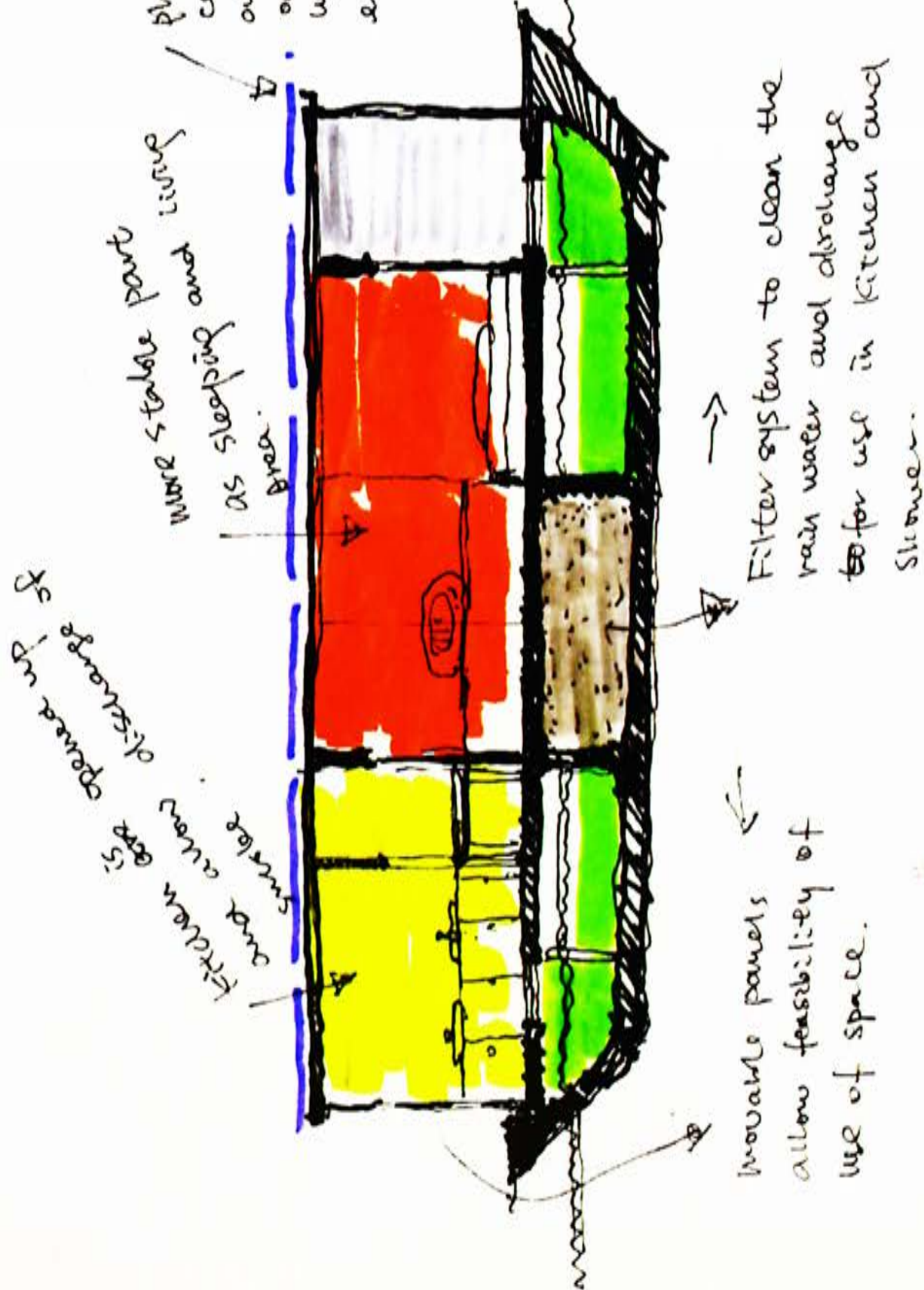
# Design Development





Design Development

Boat Houses

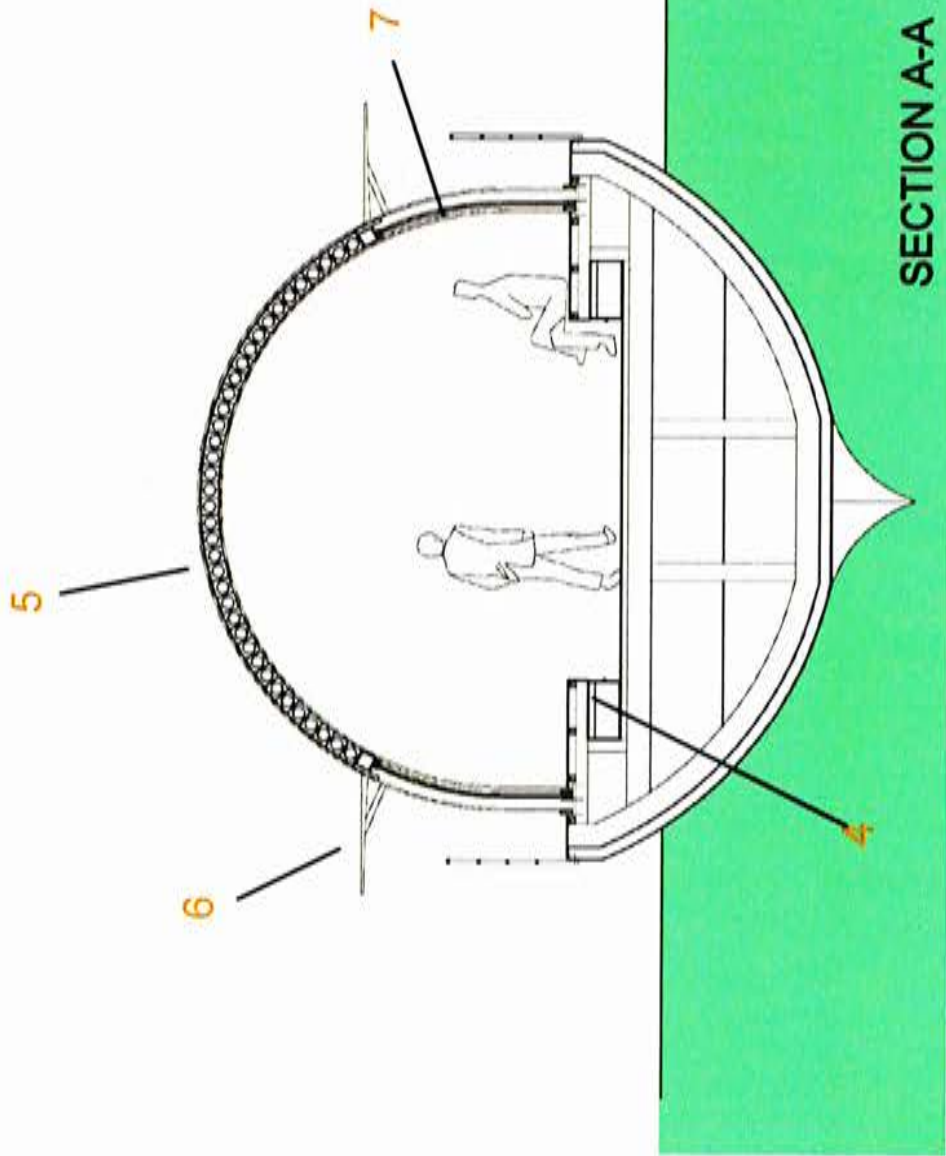
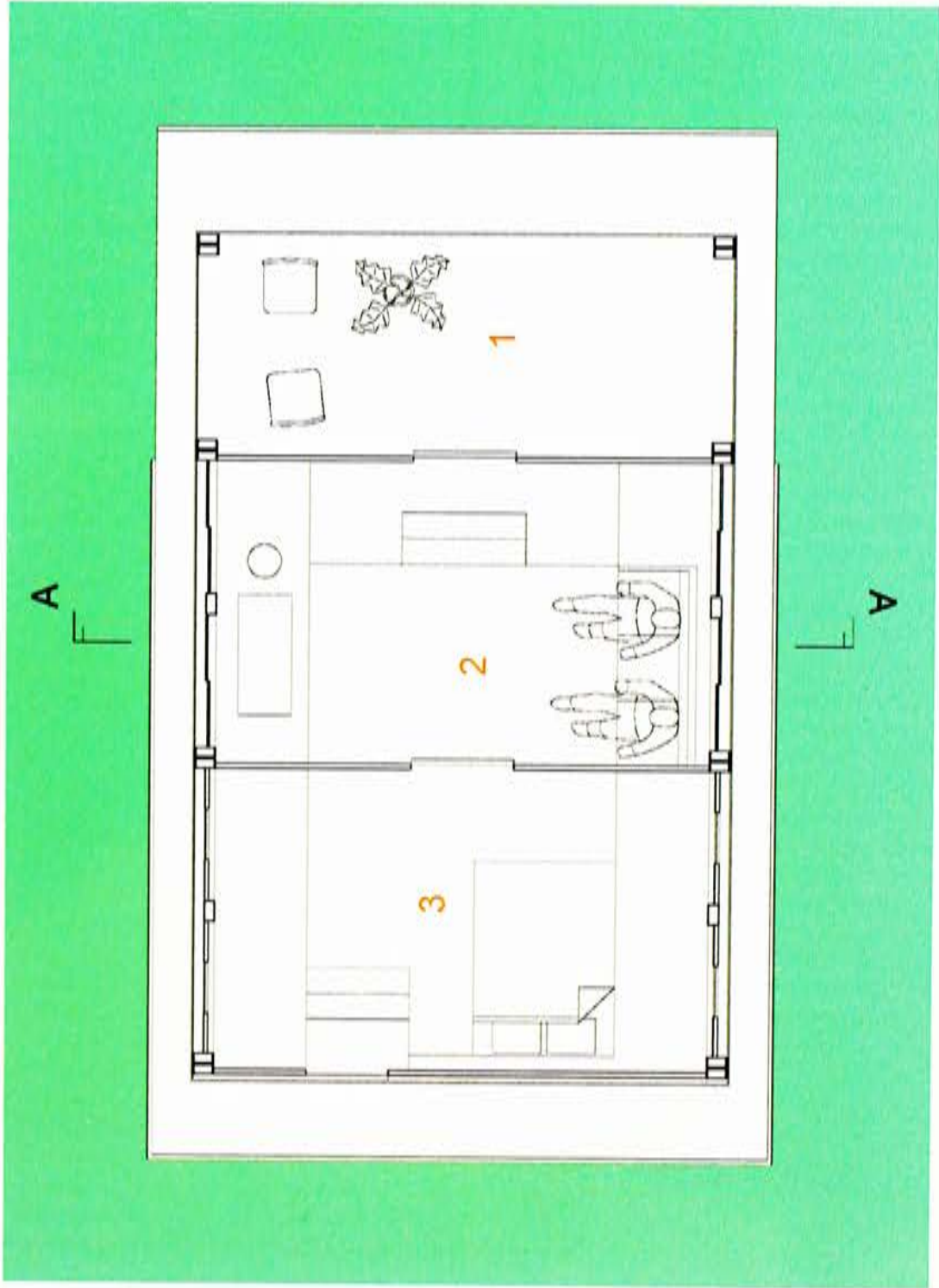
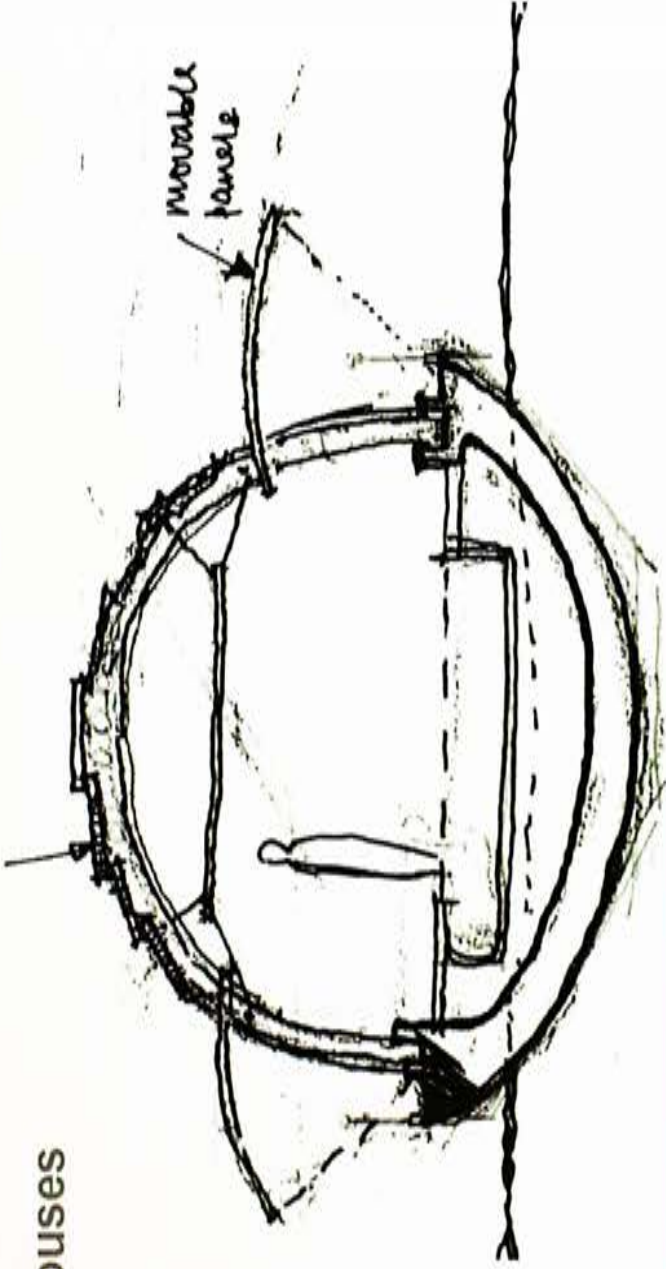




Design Development

Boat Houses

Photo Valtic cells

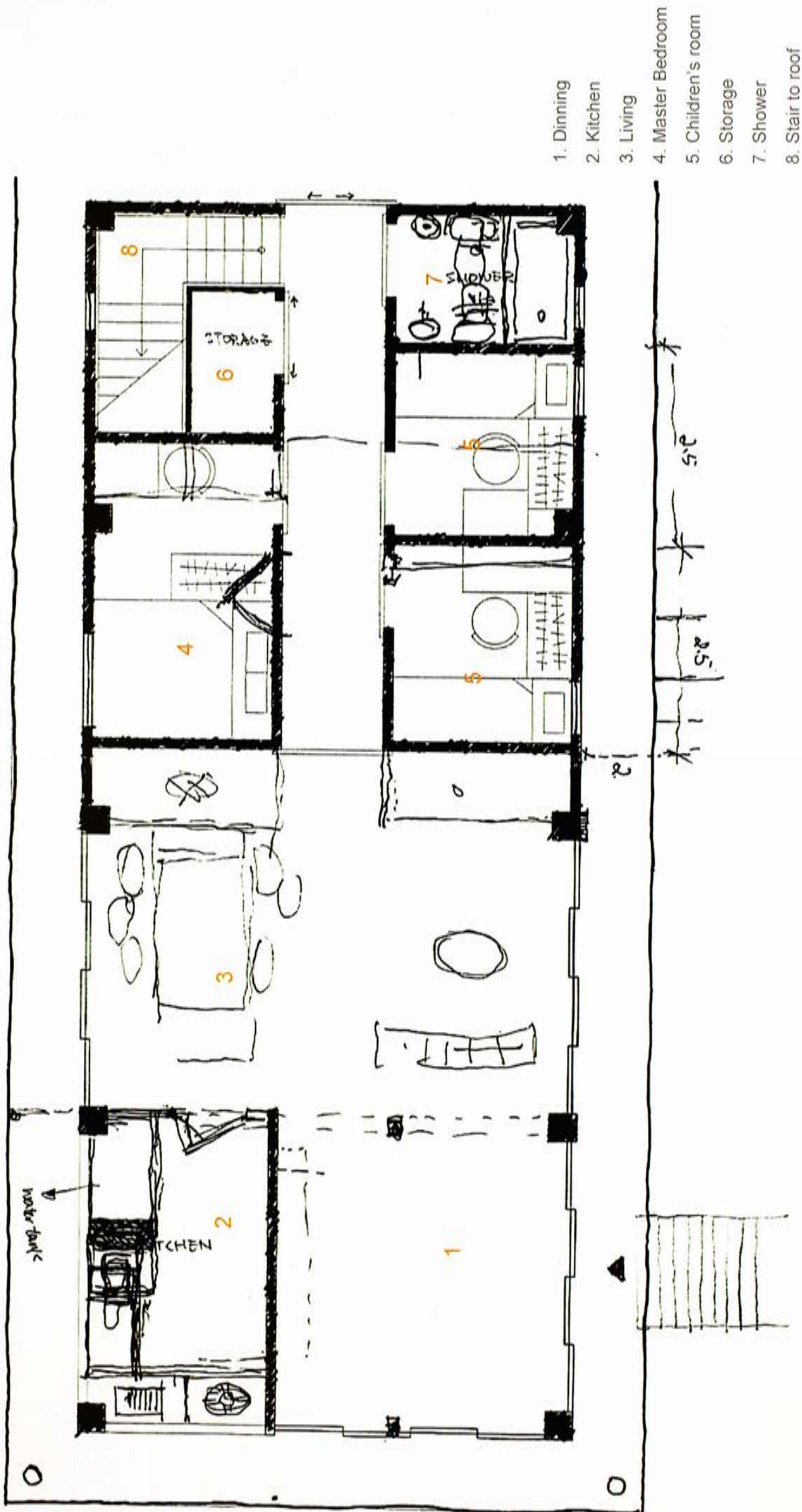


- 1. Dining and open kitchen
- 2. Living area
- 3. Bedroom
- 4. Shelves for storage
- 5. Insulated Roof
- 6. Sun shading device for anchoring of canvas
- 7. Sliding window panels



Design Development

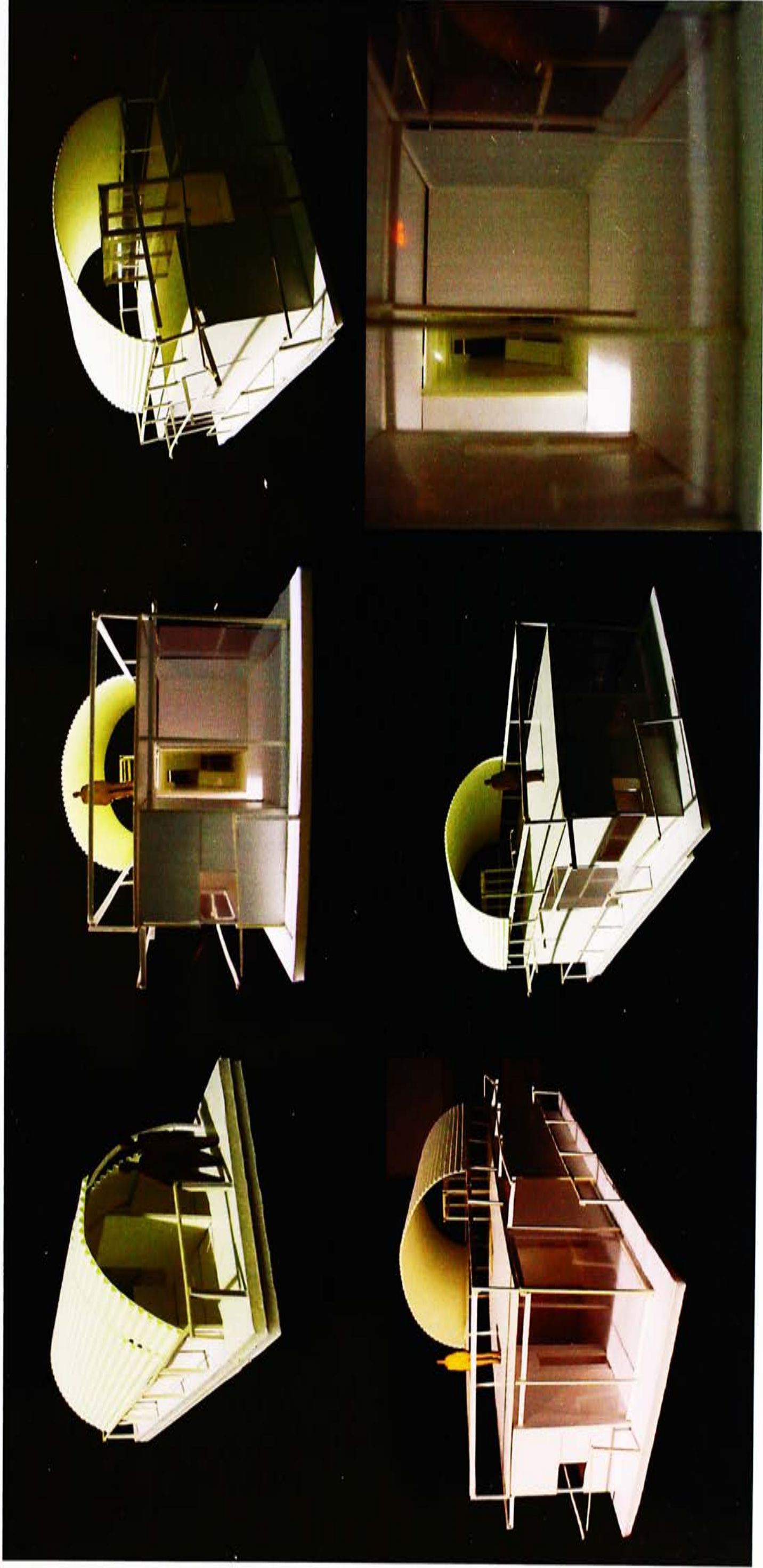
Boat Houses





**Design Development**

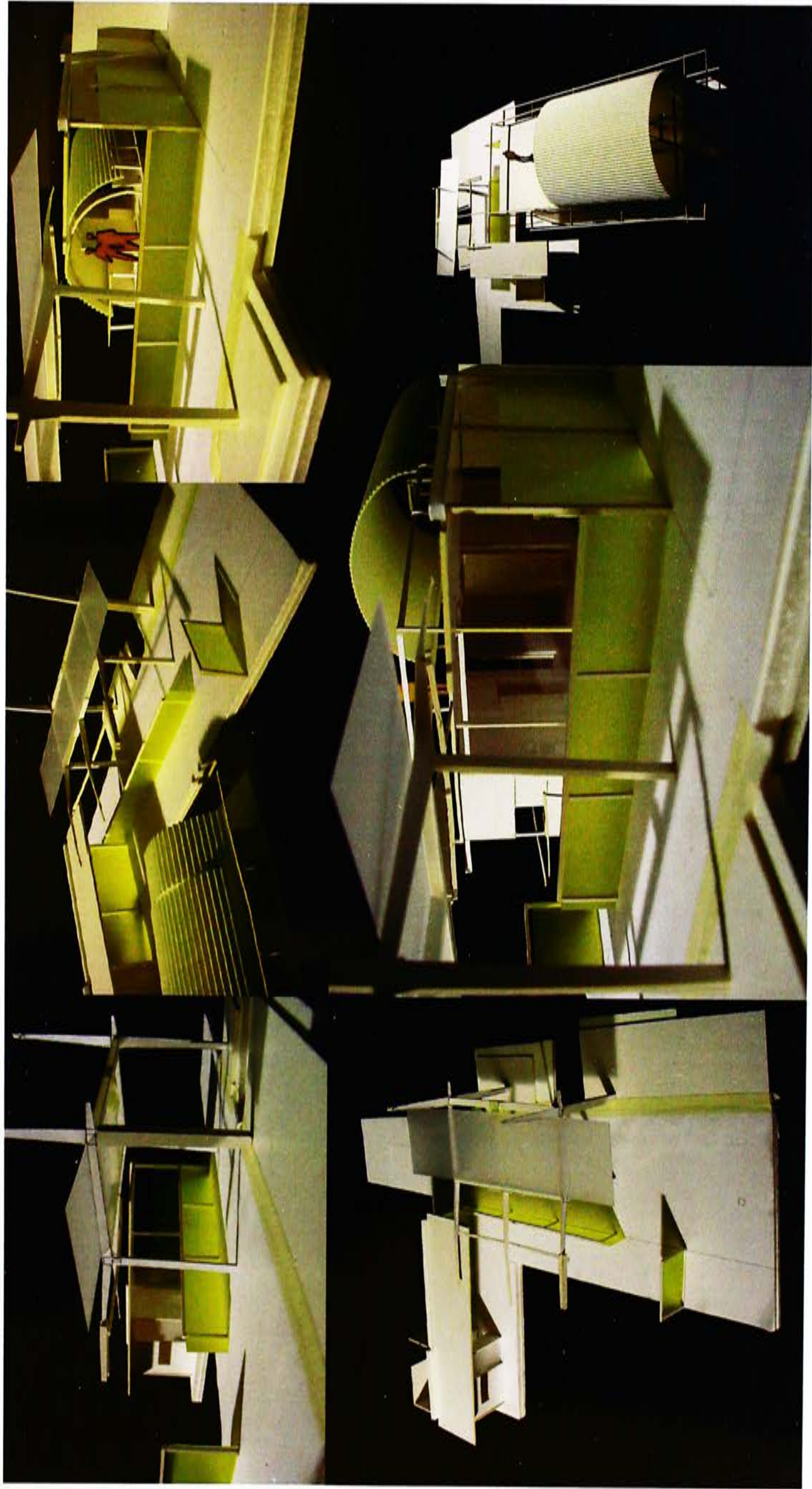
**Boat Houses**





**Design Development**

**Boat Houses**





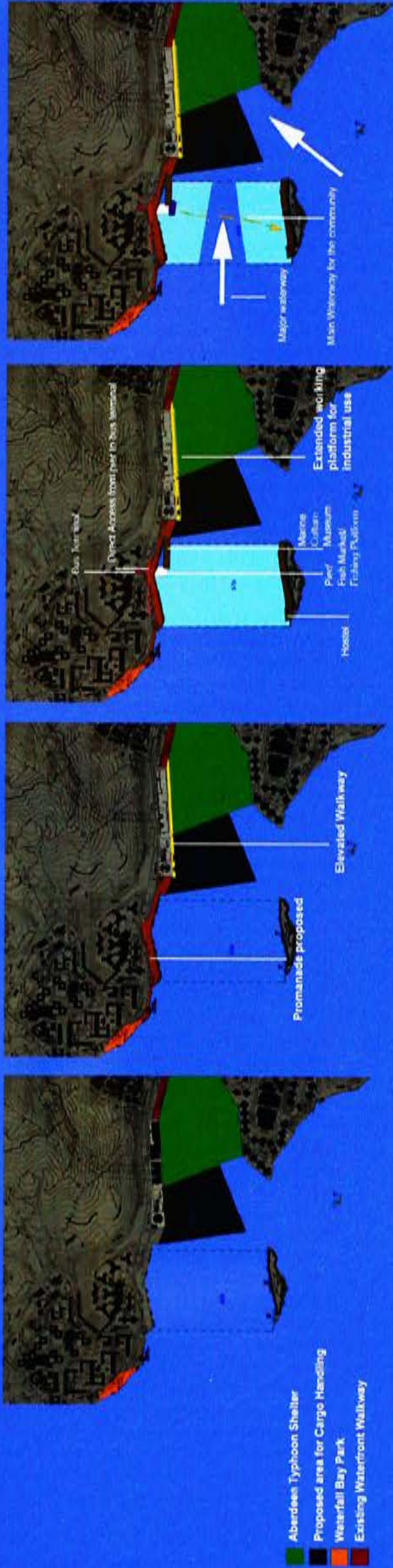
F i n a l D e s i g n



Final Design

-community is a concept which should fulfilled the commercial, social and psychological needs of the citizens  
-a community thus implies certain extent of independence which is searching for character and identity

Planning Concepts



Form Formation

Shape of boat and Idea of symmetry implied

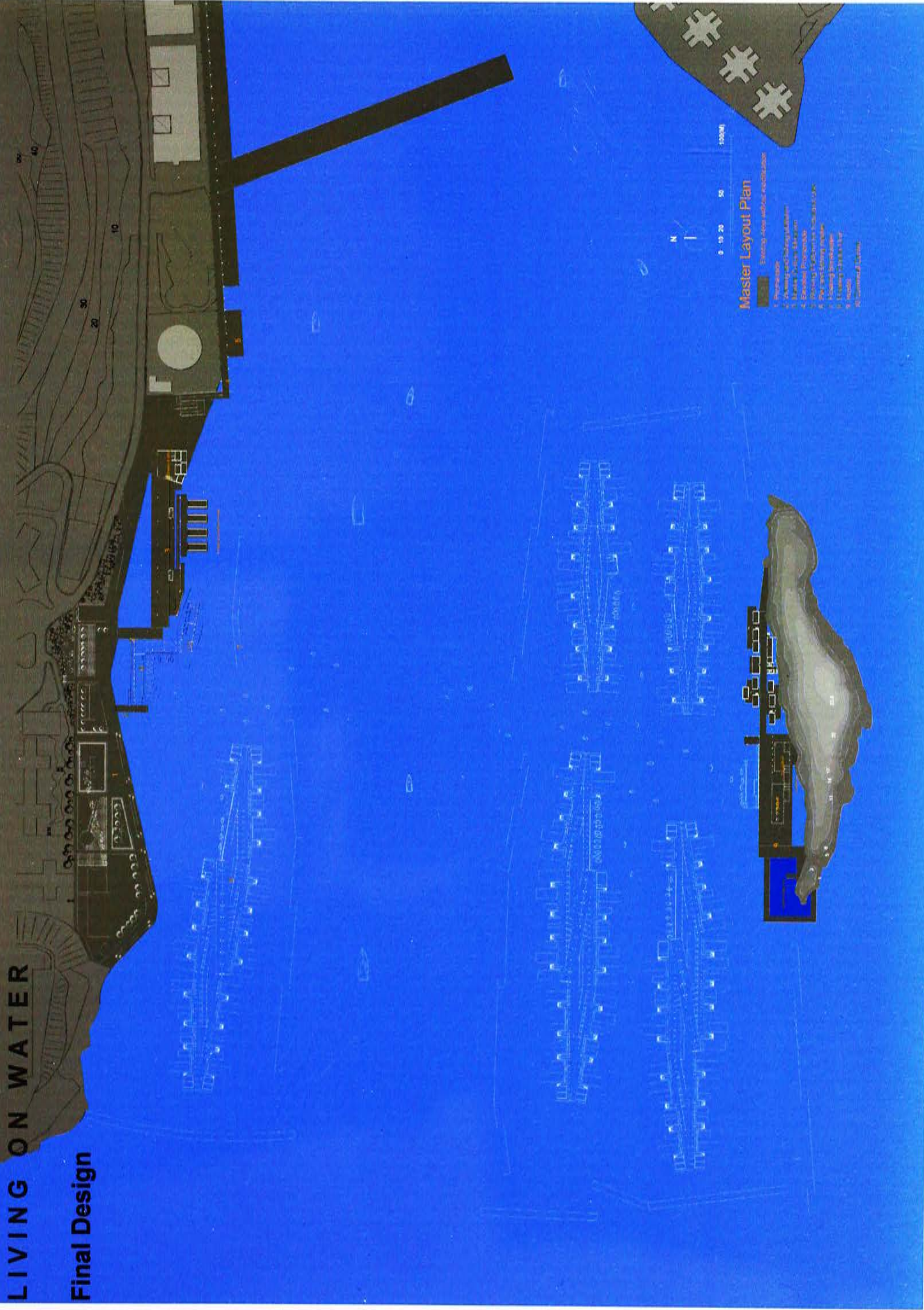
Idea of Cluster formation





# LIVING ON WATER

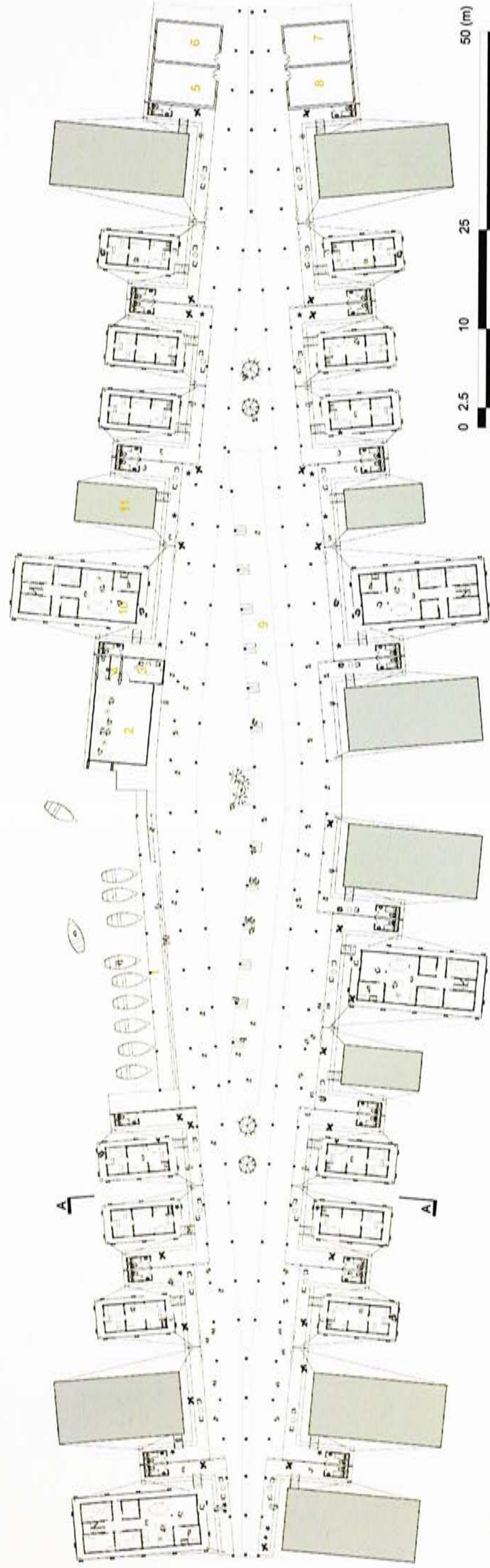
## Final Design





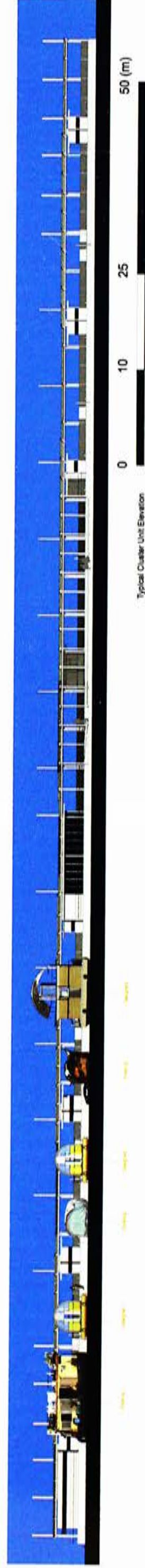
# LIVING ON WATER

## Final Design



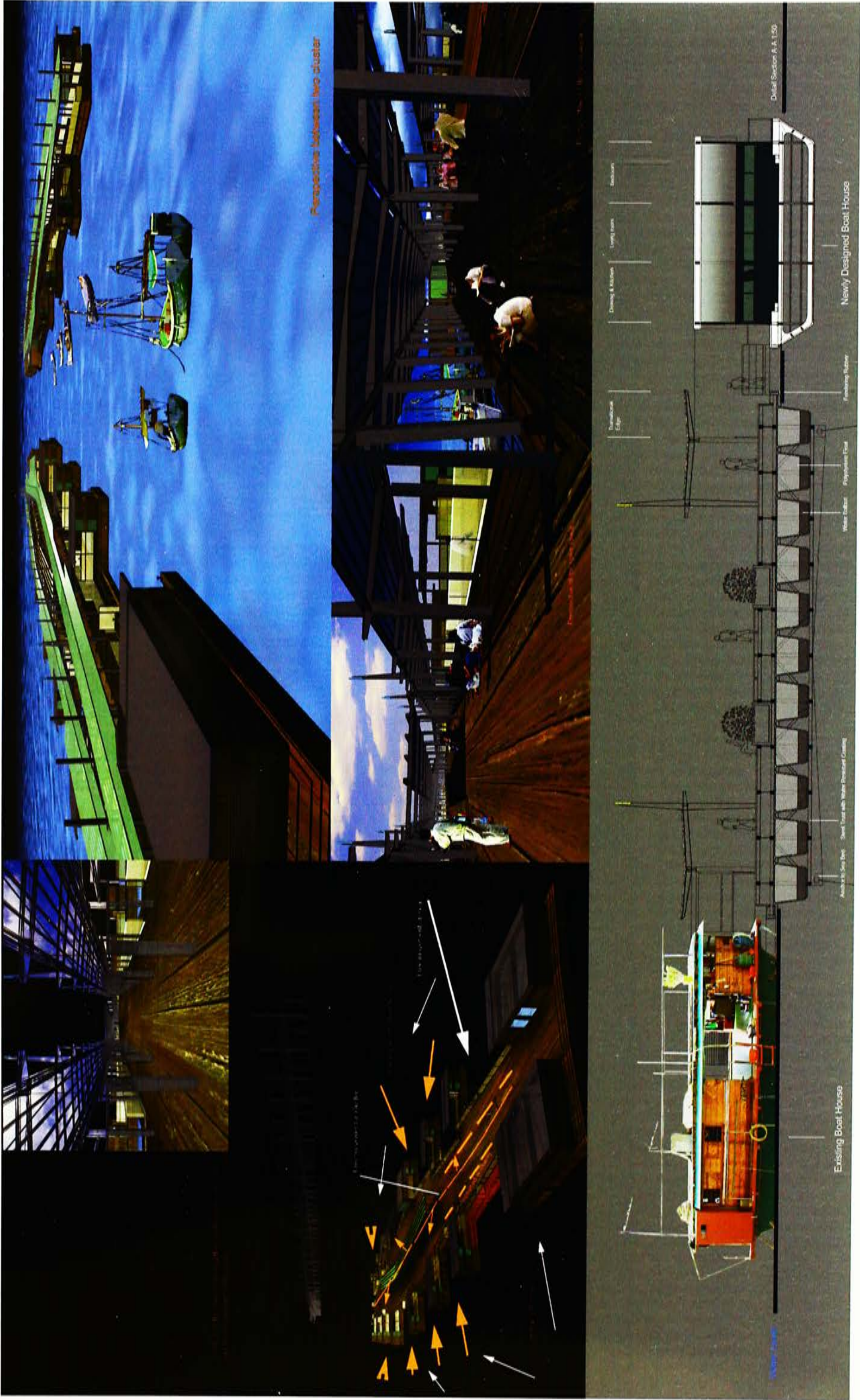
- 1. Pier
- 2. Communal space
- 3. Meeting Room
- 4. Storage
- 5. Pump Room
- 6. Gray Water Treatment Plant Room
- 7. Photovoltaic Energy Transform Room
- 8. Diesel Generator Room
- 9. Photovoltaic Cell Roof
- 10. Newly Designed Boat House
- 11. Existing Boat House

Basic Cluster Unit Plan



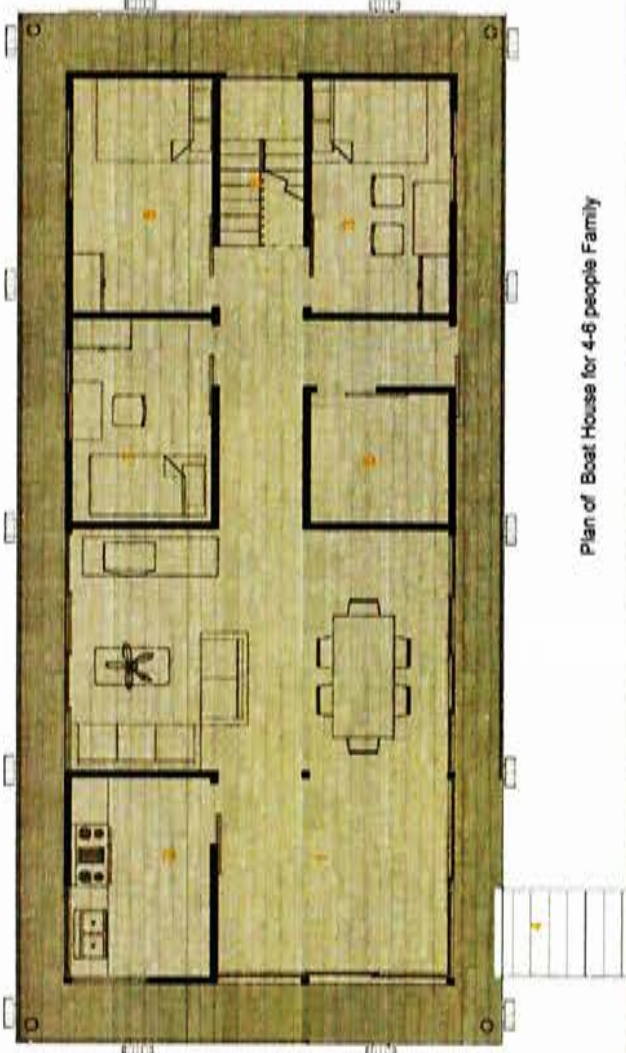


Final Design

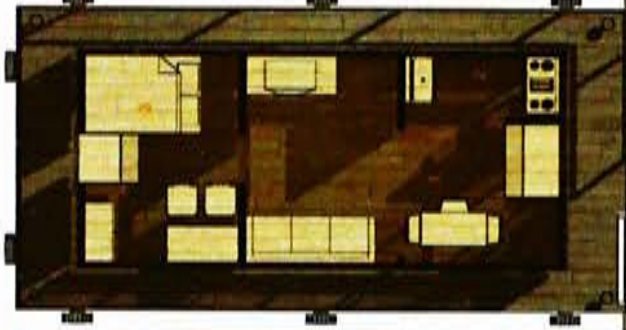




Final Design



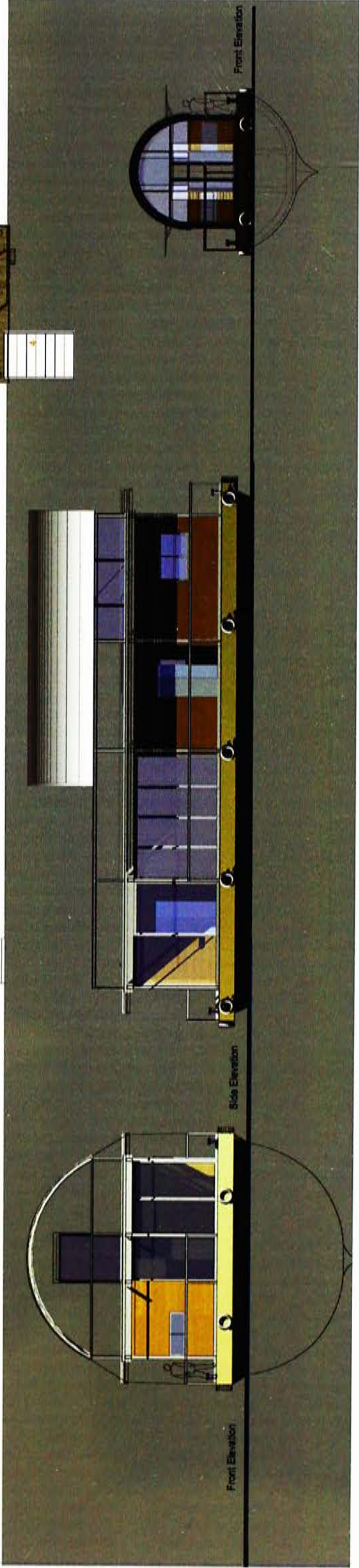
Plan of Boat House for 4-6 people Family



Plan of Boat House for Single and Couples



- 1. Living and Dining Room
- 2. Kitchen
- 3. Master Room
- 4. Pkark
- 5. Stone Room
- 6. Grand parents Room
- 7. Children's Room
- 8. Stair to Roof





# **P r e c e d e n t   S t u d i e s**



## House Boats in North America

Houseboats, which are widely found along the eastern shore of the Pacific, can be dated back to the latter half of 19th century. They are also called floating home, taking the form of dwellings on a river, lake, or the sea.

The houseboats' existence is protected by law. Coastal district acts and land-use laws prescribe where they can be moored.

Houseboats come in various size and design. However, they are governed by the building standard laws. At the same time, various measures are adapted to protect the surroundings. The most serious problem is the sewage treatment. The waste is expelled into a nearby drain on the shore by a combination of gravity and pumps.

The floating foundations can be roughly classified into 4 types:

1. **Log type**
2. **Pontoon type** (most common and economical)
3. **Hull and barge type** (based on old boats and barges)
4. **Box type** (the best in terms of dwelling and general purposes)



The houseboats are quite expensive dwellings because of the tremendous views and their resort nature.



The waste is expelled into a nearby drain on the shore and circulation path by a combination of gravity and pumps.



Electricity is supplied from land and the houses are usually equipped by boats.

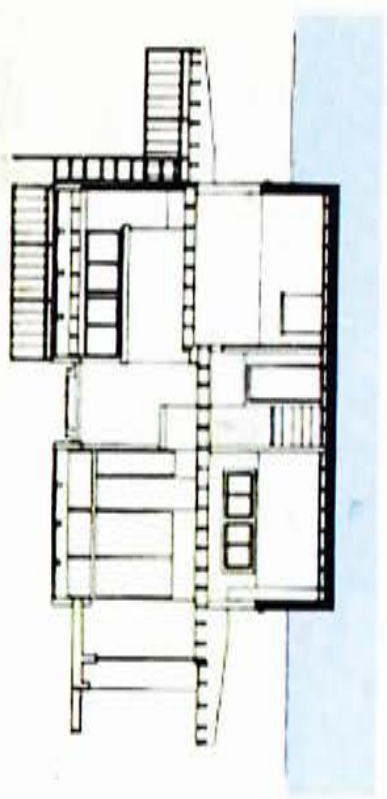
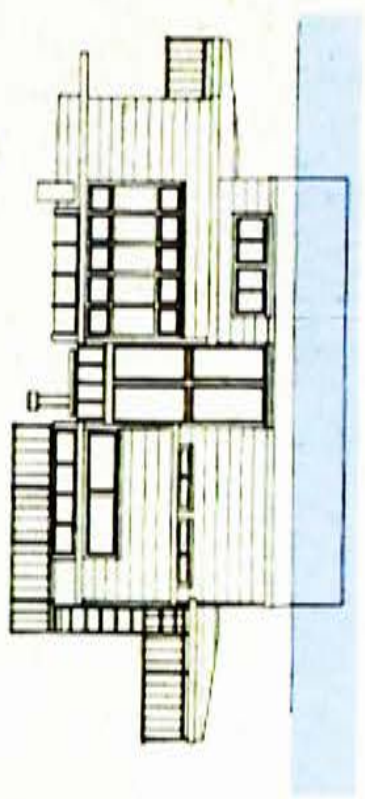
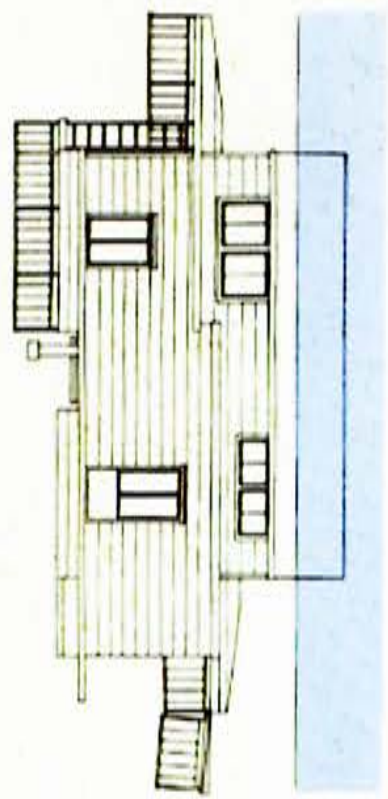
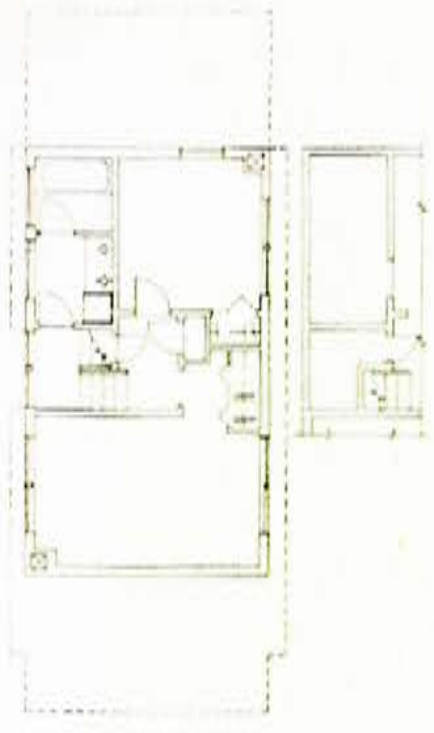
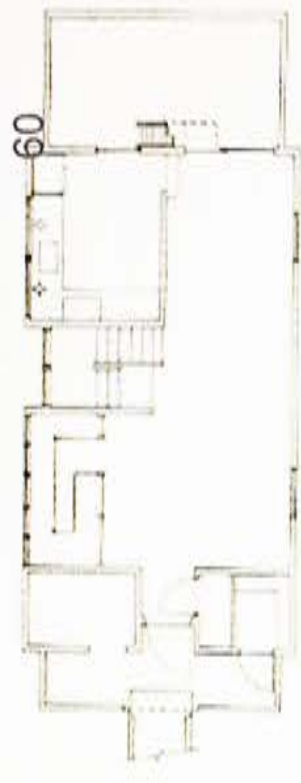
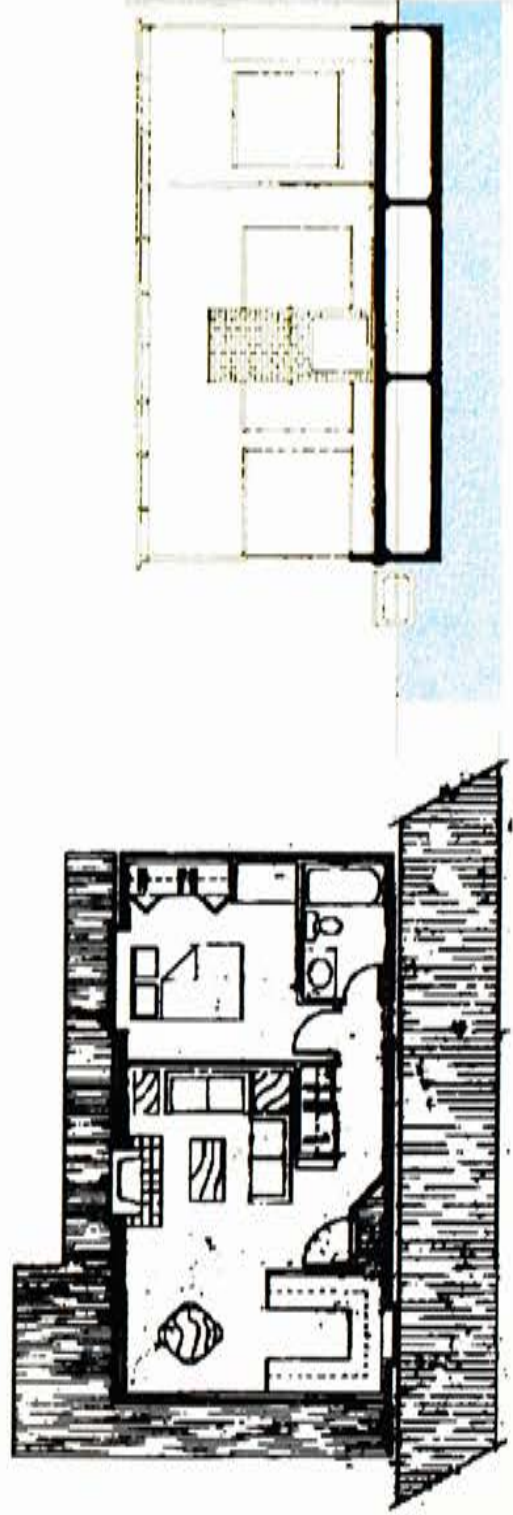
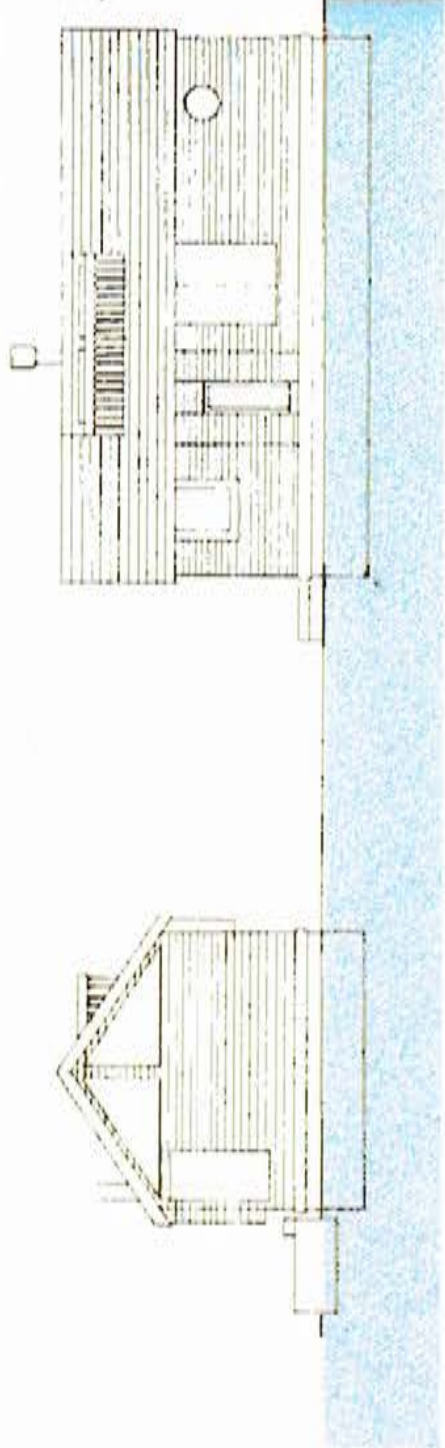


LIVING ON WATER

House Boats in North America



Houseboat with no rooms under the seaface, in Seattle



Houseboat with rooms under the seaface, in San Francisco



## Studies on Venice

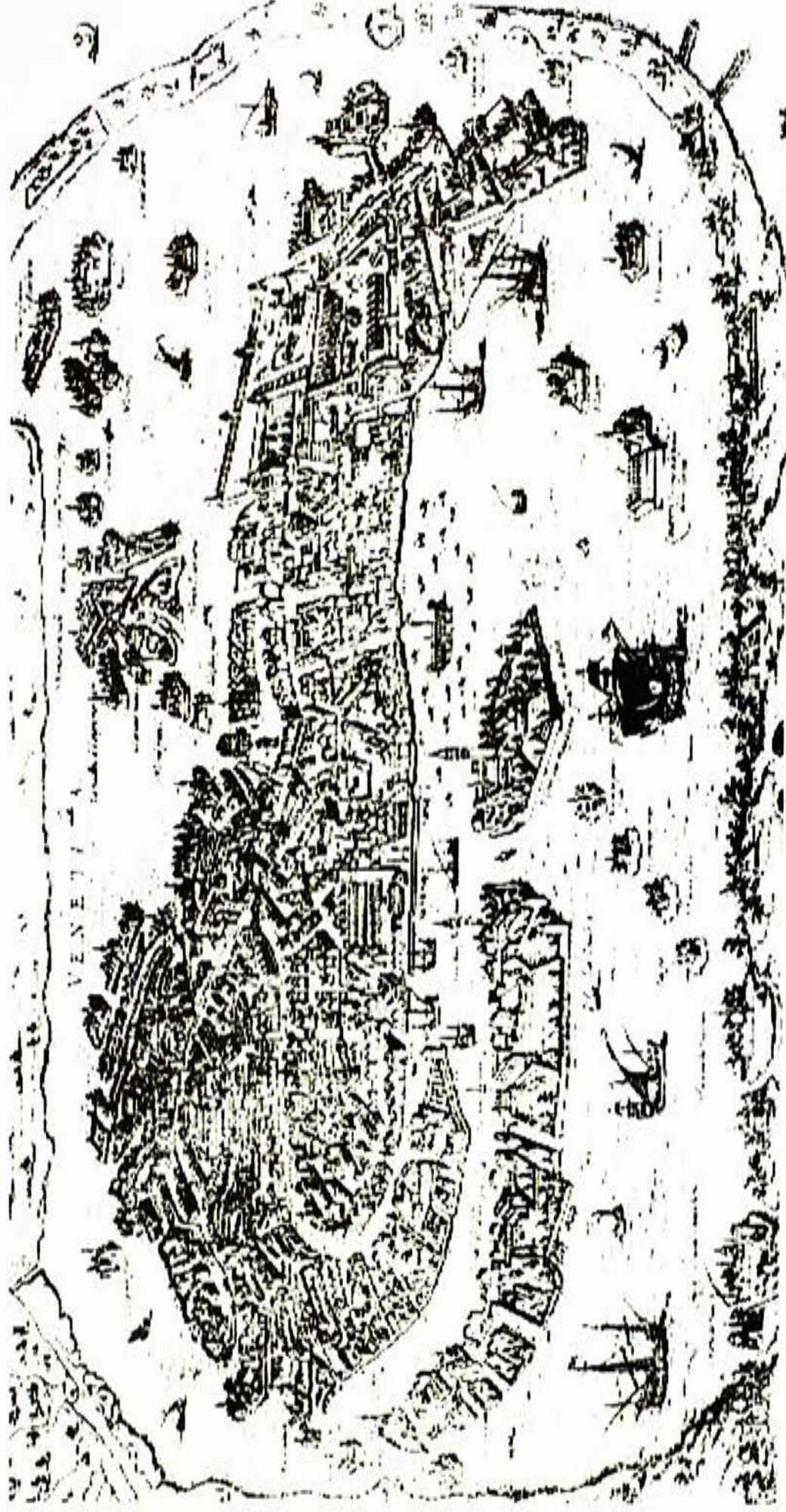
Venice, a famous water city, is characterized by her interlocking canals and close relationship with water.

### Historical Background

A lagoon location, maritime trading and cultural independence have fashioned Venice as a unique historical record of aqueducture. It has a close relationship between urban fabric, waterways and the sea with time. The city fabric is mainly determined by the outflow of the rivers from Lombardy into the Adriatic Sea. The banks formed from the deposited silt created lagoons with mud flats, islands and marshlands. The main river ways like the Grand Canal follow the outline of the river.

### City Fabrics

Venice has a very close-knit urban fabric which was developed through the limited availability of land and modest open spaces. The water forms the base of the urban pattern. The compact spaces are dominated by the geometry of building façades but maintain a human scale. Water transportation within the city has been maintained as the only alternative to walking.



A historical map showing the principle islands protected by the mud flats.



Campi and bridges



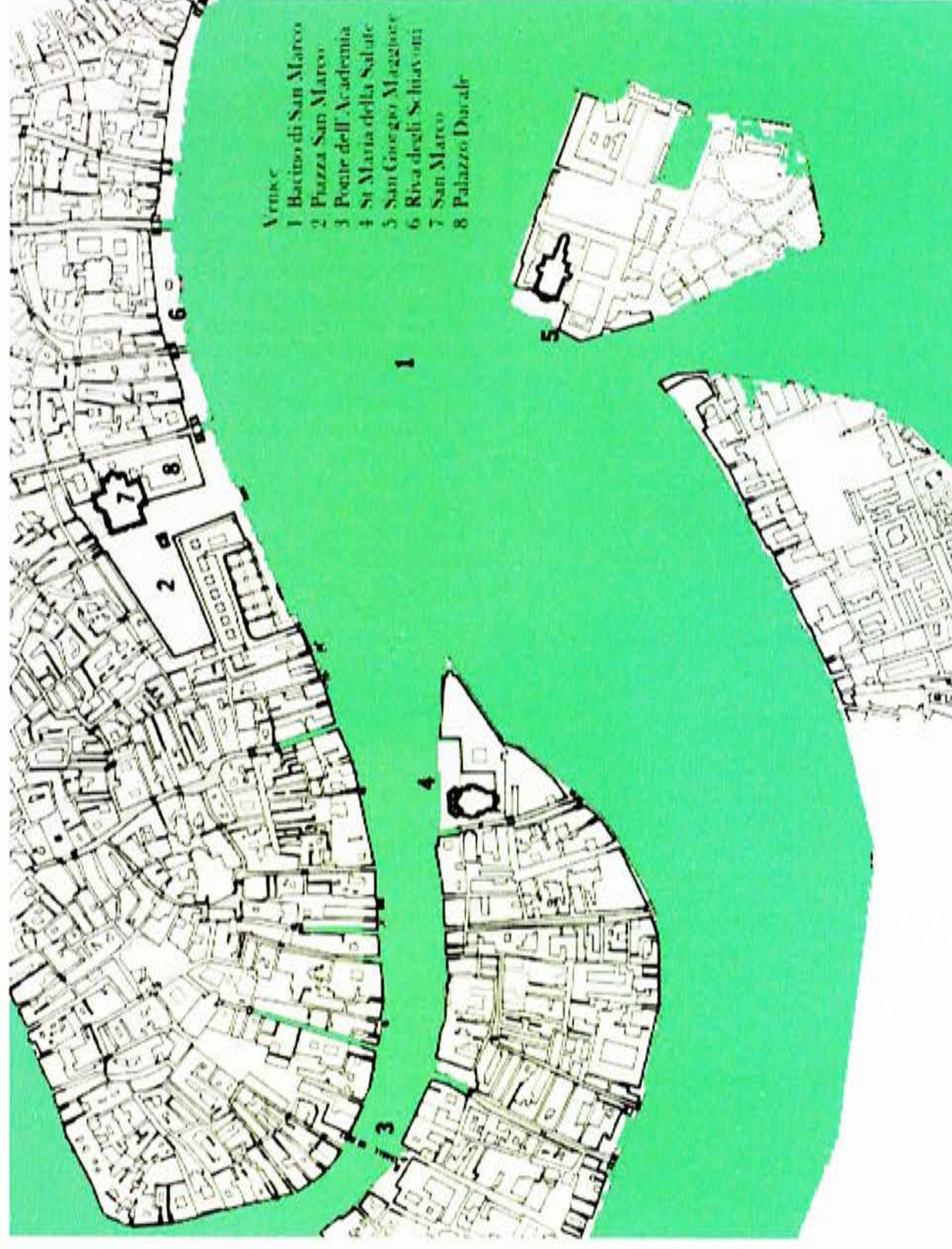
# LIVING ON WATER

## Studies on Venice

The basic form of the city consisted of the two principal canals, the network of minor canals, the pattern of small civic spaces (campi) and the pedestrian streets and alleyways. The layout of the alleyways was haphazard. Each parish was built up street around its church and campi. As the islands grew together, the street were linked on reclaimed land or with bridges.

The residential buildings reflects the various sections of the society and the Grand Canal was favoured by the wealthy merchants. The open elevations with two-storey facades along the waterfront and ground floor porticoes were used for loading and unloading merchandise. The ordinary houses line the canals and alleyways. The fisherman's housing incorporates public "work" spaces. The houses extend at right angles to the waterways with intermediate communal spaces accessible to water. These form an extension to the quay, for laying out the nets and handling fish.

The aesthetic appeal of Venice is the fresh modulation of buildings. The dynamic of light is reflected from animated water surfaces to give a romantic feeling of the place. The water transport moves gracefully, independent with its own corridors, never in conflict with the pedestrian and providing, both during the daytime and at night, a visually attractive element.





# LIVING ON WATER

## Studies on Venice

### Aqua Structure

Dykes were used to reinforce existing islands and new islands were created. Buildings were constructed either on timber rafts or on piles (about 3-4m) driven into the mud to support exterior walls.



The canal sidewalks extend into the housing providing piazza spaces for fishermen to work on their nets





# LIVING ON WATER

## Studies on the Floating Accommodation

### Polycastle Floating Hotel

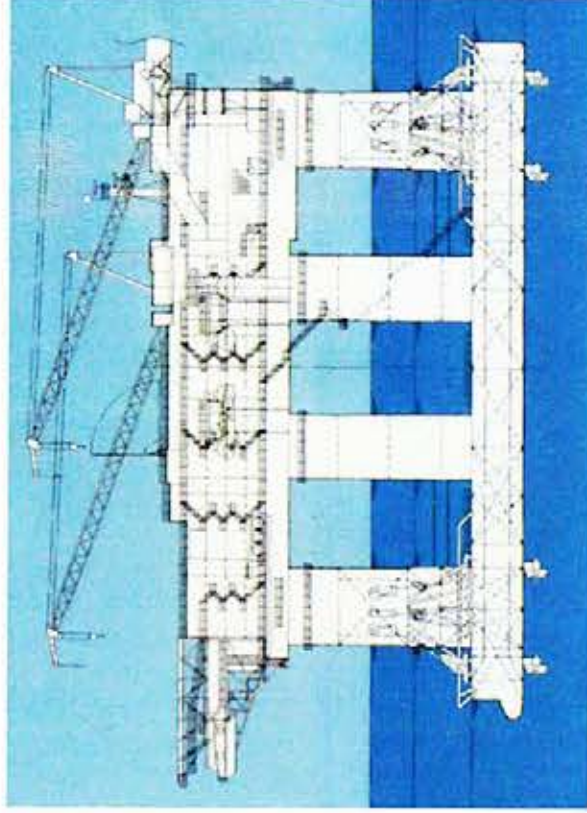
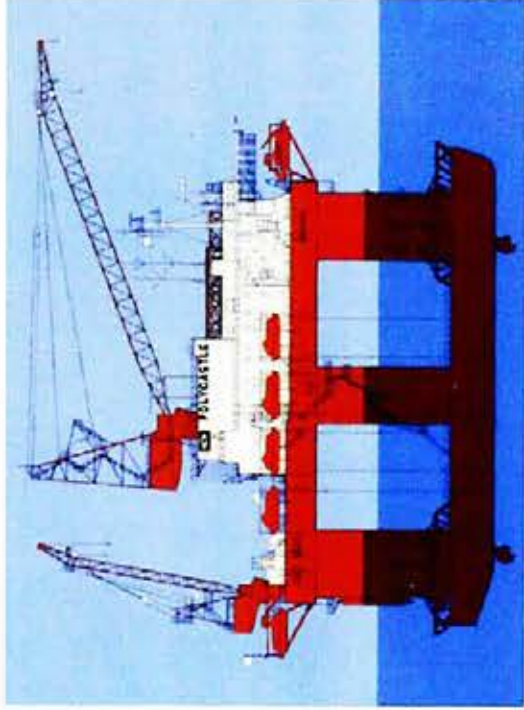
This is a semi-submersible floating hotel for workers engaged in constructing a fixed platform for the oil fields in the North Sea. It enables the maximum of about 600 residents to fully enjoy their lives in safety.

Ten mooring chains are used to moor the floating structure in position. The design allows maximum safety in the dangerous North Sea situation. Residents are still able to take refuge in safety even if an important structural member connecting the pontoons should fail. It can weather a storm still in this case. In addition, the loss of one of the ten mooring chains will not jeopardize mooring.

### Polyconfidence Floating Hotel

It is also a hotel providing facilities in North Sea oil fields. The accommodation area is built on the platform which is connected to floating pontoon with structural members. It is built above sea surface in order to get rid of the strong wave in North Sea.

The moorings for this floating structure are supplemented by a high-reliability dynamic positioning system which makes use of thrusters to minimize pitching and offer a comfortable dwelling space. This system serves to maintain the platform's position adjacent to a fixed plat- form even in areas where anchors cannot be used because of undersea pipelines.





# **S p e c i a l   S t u d i e s**



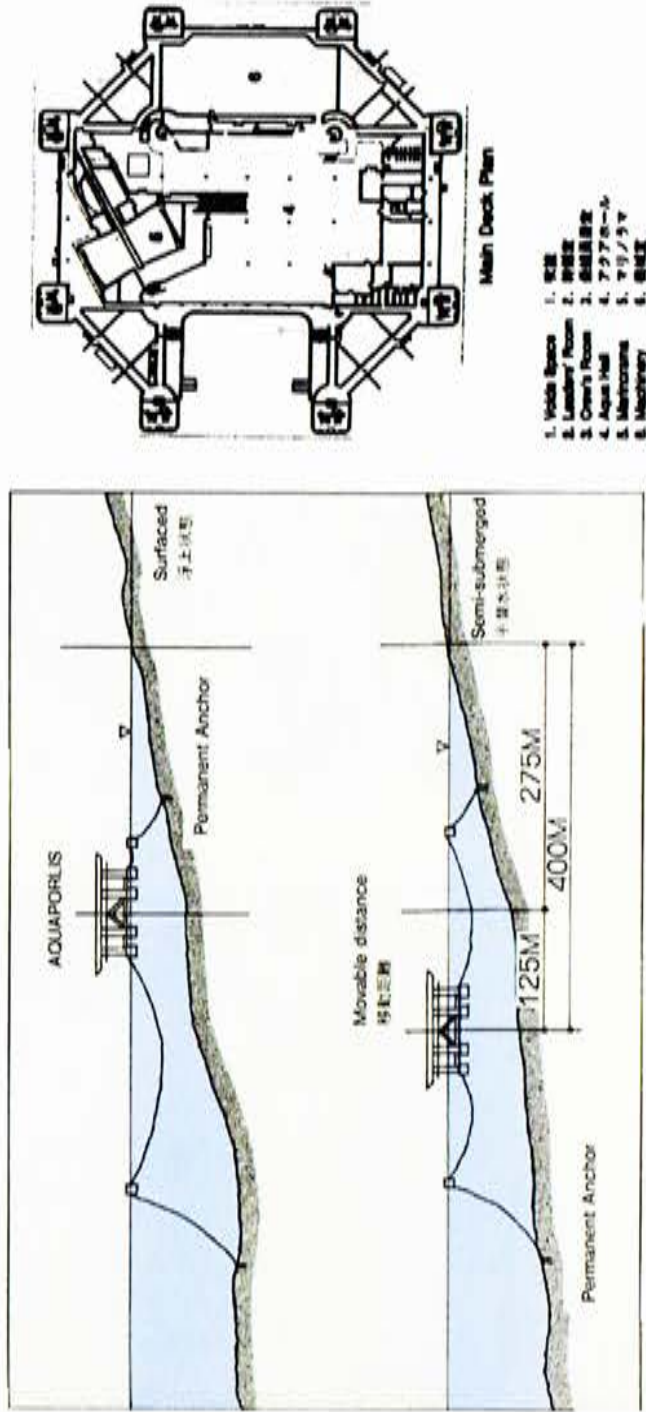
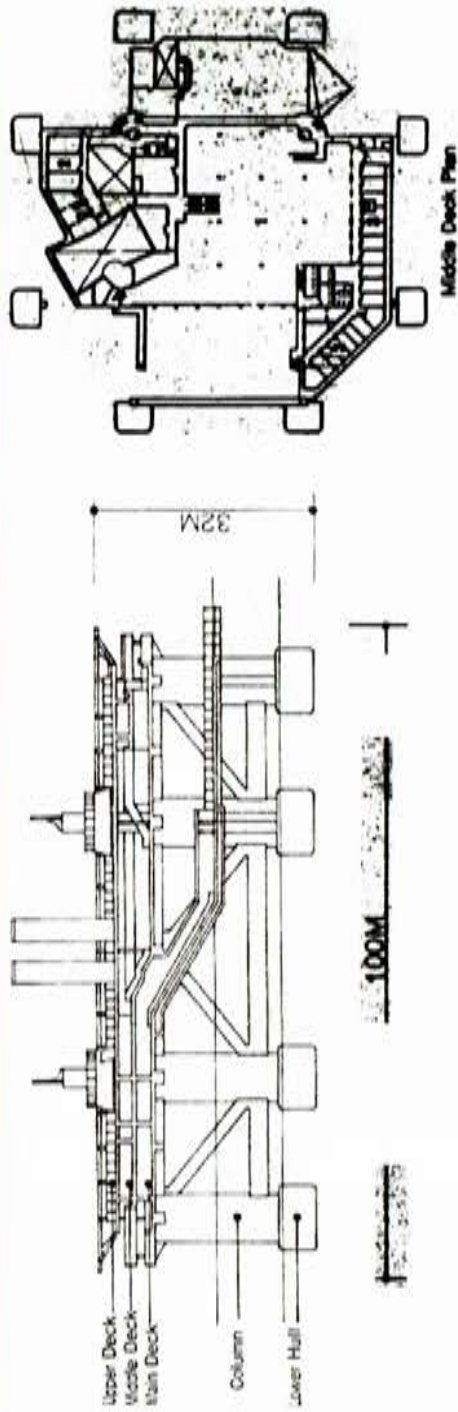
## Studies on Floating Structures

Floating Pavilion in Japan -  
“Aquapolis”

The pavilion is designed for expo'75. Sixteen columns on four horizontal buoyant foundations (called the lower hull) support the superstructure. These four lower hulls and 16 columns of the semi-submersible trussed-rahmen design are an application of the platform system used in off-shore oil production.

Buoyancy can be adjusted by pumping water into or out of the lower hulls and columns, thus allowing them to surface, half-submerge, or submerge to adjust the position of the center of gravity. Further, “Aquapolis” can be moved horizontally by up to 200 meters by winding on chains anchored on the seabed. This maneuverability enables the structure to weather severe natural conditions, including typhoons.

Besides, a closed system achieves energy-saving without polluting the surroundings with drainage and waste matter.





## Studies on Chinese Raft House in Indonesia

The veranda area surrounding the periphery of the raft house, especially for the side area being connected to land, platforms and other houses, is one of a very highly socialized space. It also provides a cooling corridor and sun shading device for the interiors. It allows the windows and doors kept open even in case of rain.

The floating houses are tied together to provide larger stability by increasing floating surface area. It provides extra protection in high wind monsoon conditions. Poles are used to anchor the houses in position. It, thus, is easy for the house to be moved and relocated.

The floating population can earn a living by fishing. Storage and transportation materials are the major income for some of the dwellers. Education is only provided on land. There is no potable water provided. The main sources of fresh water are come from rainwater and the rivers themselves. The sewage will discharge into the river directly.



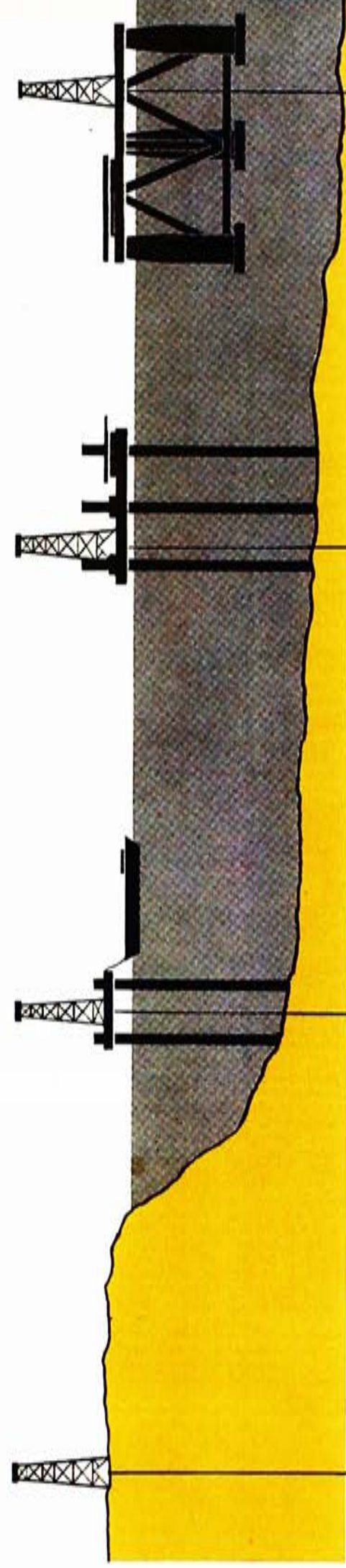


## Studies on Off-shore Platforms

The off-shore platform for oil and gas drilling is the most incredible structure in the sea. It compacts all the living environment within a platform. The transportation is mainly by helicopter with supplement of supply ships.

### Classifications

There are 3 kinds of designs to meet the needs of marine drilling. They includes **fixed platforms**, built on piles driven into seabed; **movable platforms**, which are towed to the drilling site and there anchored to the seabed by lowering their steel legs; and **floating platforms**, from which the drilling equipment is lowered on to the seabed and operated either by remote control or with the help of divers.

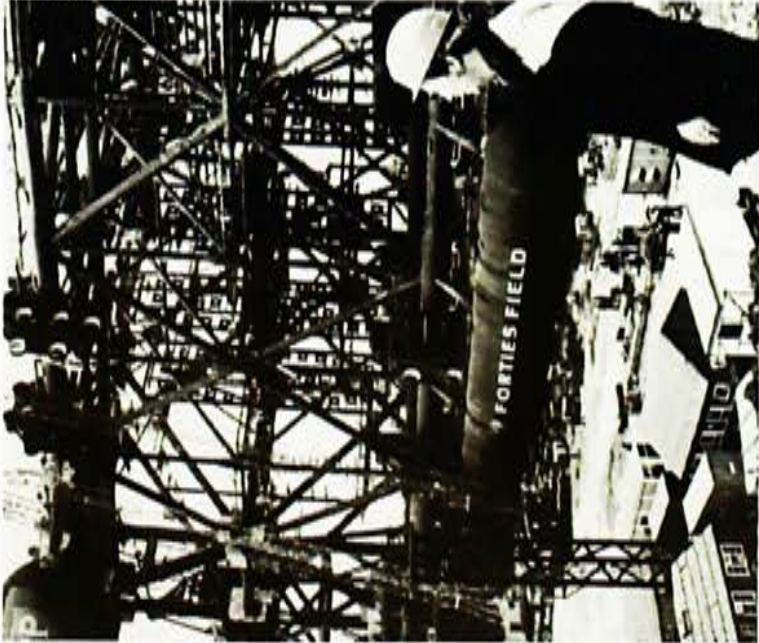


*Four types of drilling rig: a land rig, an underwater platform with a drilling barge, a movable platform, and a floating rig held by anchors.*



Studies on Off-shore Platforms

Assembly Procedures



Foundation structure is built on land

Structure is towed by ship to the target location

The structure is then sunk into the sea

The structure is then stabilized by heavy weight of the platform or suction of the mud in sea bed



Studies on Off-shore Platforms

Life on Platform

The life in the platform is very hard and dull. The noise on a rig is deafening. The roar of the waves and howling of the wind seem to be drowned by the whine of the drilling operations. The decks are usually wet and slippery, the air is heavy with the smell of oil, grease and cement.

It is rather isolated and the cabins are small but comfortable, and the food is also good.

It often offers four bunks to a cabin. Below deck the consumption of alcohol is strictly controlled. There are weekly film shows, card playing and dartboards, but otherwise recreation is limited. Television reception is only possible on rigs fairly near shore, but those farther out the only real links with the outside world are wireless and the service boats which bring in the supplies.

PROFILE OF A PLATFORM

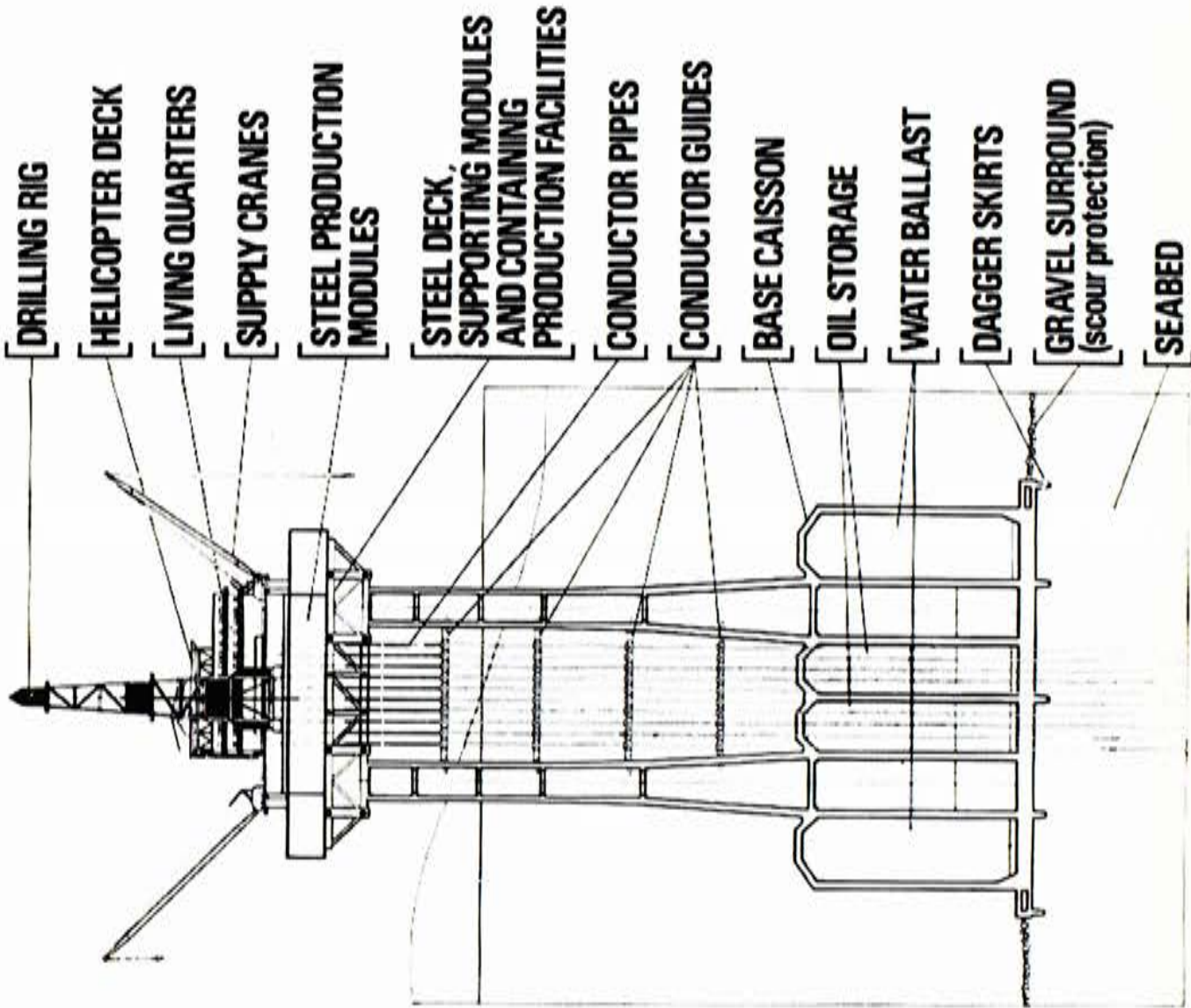
The giant concrete gravity production platform being built by McAlpine - Sea Tank in Scotland for Shell-Esso's Brent off'shore oilfield, 100 miles N.E. of the Shetland Islands in the North Sea.

SOME FACTS:

- A cellular base 298 feet square and 177 feet high will rest on the seabed, with four towers rising 352 feet from the base to support a steel deck with an area of 42,000 square feet and weighing 3,100 tons.
- Production equipment and living quarters will place a load of more than 6,000 tons on the operational deck. The structure will displace 436,300 tons of water. It will provide storage for more than 600,000 barrels of crude oil.
- Construction to deck level will require
- 257,000 tons of concrete ● 3,100 tons of steel for the deck ● 15,000 tons of reinforcing steel

Work on board a rig can be very monotonous. Much of it is routine. You need to spend long hours in painting, scraping rust or washing down the decks.

The diving is probably the most dangerous of all rig jobs. Divers are needed by oil companies on exploration rigs and the production platforms to provide a "first aid" service. They go down if anything goes wrong. The divers live in a decompression chamber for as much as three weeks at a time. Much of their time is spent hanging around waiting.





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